PLANTS FROM THE PARK:

ESTABLISHING COMMUNITY HARVESTING OF PLANTS AS A CONSERVATION TOOL AT BWINDI IMPENETRABLE AND MGAHINGA NATIONAL PARKS, UGANDA

By

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August 2001.

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ACRONYMS

BINP	Bwindi Impenetrable National Park
DTC	Development Through Conservation Project
ICD	Integrated Conservation and Development
ICDP	Integrated Conservation and Development Project
IFCP	Impenetrable Forest Conservation Project
IGCP	International Gorilla Conservation Programme
ITFC	Institute of Tropical Forest Conservation
MGNP	Mgahinga Gorilla National Park
RC I-V	Resistance Council I to V
RVA	Rapid Vulnerability Assessment
UNP	Uganda National Parks

PREFACE

The fieldwork for this research was carried out on a part time basis, from 1992 to mid 1994, while I was the Deputy Project Manager of the CARE Development Through Conservation Project. My major responsibilities, in this position, were to lead the management planning and resource use establishment processes for the Bwindi Impenetrable and Mgahinga Gorilla National Parks in Uganda. The work, therefore, was carried out under a real conservation situation. The development of these "processes" cannot be the work of one person alone but is the contribution of a group of people, in this case the CARE Development Through Conservation Project and Uganda National Parks staff and the community members with whom I worked. In my role as the leader of the team I made most of the decisions regarding approaches, systems to be established and led most of the fieldwork. Throughout the text I have used "I" and "we" as appropriate to reflect my work and this teamwork. Most of the work was written up from September 1994 to April 1995, at the University of Cape Town, supported by the World Wide Fund for Nature, and a popular version has been published as a working paper of the "People and Plants Programme", (Wild and Mutebi, 1996). This programme is an initiative of WWF, UNESCO and the Royal Botanical Gardens, Kew, UK. Part of this work has been published (Wild *et al.*, 1995).

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[2] Since the fieldwork for this study the names of some places and institutions have changed. Uganda National Parks, for example, is now called Uganda Wildlife Authority (see section 1.1.6). The original or new names are used as and when appropriate to reflect former and current political and institutional arrangements.

ABSTRACT

It is now accepted that communities surrounding national parks in developing countries should benefit from conservation if the parks, and their constituent biodiversity, are to have a secure long-term future. It has also been accepted as morally questionable for communities living next to parks to pay the costs for national and international biodiversity conservation, and at the same time being excluded from any level of decision making regarding the management of those parks. Strategies to achieve conservation with equity include community involvement in park management and mechanisms to share conservation benefits. The use of in-park plant resources is one such mechanism, which has the potential to enhance conservation and provide local benefits.

While these ideas are now have widespread acceptance, this has come as the result of intense and sometimes acrimonious debate. Conservation initiatives that have attempted to promote community development have not always achieved a positive conservation or development result and a section of the conservation movement remains sceptical. Integrating conservation with development presents a number of significant challenges and requires an understanding of and ability to work with local communities that hitherto was not the preserve of the conservation biology.

This thesis documents research into, and the pilot establishment of, local community use of plant resources from within the Bwindi Impenetrable National Park in Uganda as a method for enhanced conservation. Some examples are also given from similar work carried out at the Mgahinga Gorilla National Park. The establishment of plant use from within Bwindi Park took place following complete closure of the Park following heavy and uncontrolled use, and a bitterly contested change of management authority from the Forest Department to Uganda National Parks. The latter move being driven by international pressure to improve the conservation status of the Mountain Gorilla (*Gorilla gorilla beringei*). The study takes place therefore in the context of pressures to both improve conservation of biodiversity and improve the involvement of and the benefits to local communities. This was at a time when community involvement was a new idea only slowly gaining acceptance and the institutions involved had little or no experience of making it happen. The research was carried out as part of an integrated conservation and development project

that supported the park authorities to pilot utilisation activities, when the policy and legal framework did not support this kind of activity. The study used both ecological and social tools to establish collaborative or joint management agreements with communities over resource use. First the logical framework approach/objective orientated project planning was used for participatory park planning. Then a method, named here as 'rapid vulnerability assessment', was used to assess the vulnerability of plant species for use. Rapid vulnerability assessment uses a mixture of established ecological principles with indigenous knowledge to enable rapid decision-making in a context of limited time, resources and trained personnel. Participatory rural appraisal, a development tool, was used to work with three communities in data collection and the negotiation of agreements over use of medicinal plants and basketry species from "multiple-use"[3] areas located at the park edge.

Park management plans for the two National Parks were produced and the types of costs that local communities pay, resulting from loss of access to resources, were documented, while consensus objectives for community resource use were established. Participatory fieldwork was carried out, data collected and analysed, 'Forest Societies' were formed, based on existing institutions and 'Memoranda of Understanding' signed, in three civil parishes adjacent to the Impenetrable Forest. Fifty-seven plant species were sanctioned for harvesting by 116 community nominated harvesters, serving a total population of c. 6000 people. Harvesting started from the multiple-use areas.

The response of the communities of the pilot communities was initially sceptical but became more enthusiastic as the programme developed and the relationship between park authorities and the communities moved slowly beyond previous hostilities. This reduced the risk of arson within the park and political campaigning for degazetting. Initial indications were that a significant group within the pilot communities were committed to the control of community members within their own limitations, but that the park authorities needed to support communities in that role and to maintain vigilance in

[3] The term "multiple-use" initially had the meaning of multiple land-use at BINP, i.e. biodiversity conservation, tourism and low impact resource use. Later it evolved to refer just to the low impact resource use programme.

compliance of agreements, and against petty infringements. Park authorities initially remained limited in their own capacity to play a support role and even to honour their own side of the multiple-use agreements and ongoing support from external agencies was required.

Joint or Collaborative Management was at the time a new conservation technique which showed promise in the conservation management of the park, while even the conservative resource use established here provided badly needed resources to communities and so restored some limited equity and some sense of local ownership of the forest. Importantly the process initiated formal lines of communication between communities and Park staff. The tools and components used to establish co-management of resources were tested and assessed. Regarding the wider debate over integrated conservation and development, it is suggested that "buffer zones" are referred to as "support zones" recognising positive aspects of collaboration.

Limited and controlled resources use, contributed at a critical time in the history of the conservation of the forest. On its own resource use would not have secured a positive conservation and development outcome, it has, however, contributed, along with other integrated conservation and development initiatives to a conservation programme that has and continues to make a significant contribution to the conservation of all the national parks in Uganda and is becoming increasingly recognised as a successful model for conservation and development.

1 CHAPTER ONE: INTRODUCTION

Over the last fifteen years there has been a major shift in biodiversity conservation thinking, from "people exclusive" to "people inclusive" conservation. This has been largely as a result of the limitations of conventional, people exclusive, protectionist policies to save wildlife, but also as recognition that conservation at any cost is not acceptable on moral grounds (Jacobs and Munro, 1986, West and Brechin, 1991; Western, 1994; Pimbert and Pretty, 1997; Stevens, 1997; Hulme and Murphree, 2001). Under people exclusive policies, communities close to the edge of protected areas have often borne the major burden of these policies. During the late 1980's new initiatives to reduce this burden on local communities and to integrate conservation with development have been attempted. A number of mechanisms to share the benefits of conservation with local communities have been suggested. One suggested mechanism is the controlled harvesting or wise use of park resources from within buffer zones at their periphery. While the term "wise use" is now in vogue, ideas on its practical application have remained, however, vague. Further, resource use, as a conservation tool has been a focus of intense debate. Questions have been raised about its sustainability, practicability and manageability. The "buffer zone concept" has been queried, as has the ability to effectively link conservation with development. In Uganda, the conservation of wildlife resources has been revived following the re-establishment of political stability. New national parks were created from the country's biologically important forest estate. Previously these forests were widely used and misused. Conversion to national parks led to the cessation of all activities within two parks in the southwest of the country, the Bwindi Impenetrable[4] and Mgahinga Gorilla National Parks. The hostility subsequently created amongst local communities in itself presented a danger to the long-term future of the parks. This work documents preliminary planning work at Mgahinga Gorilla National Park and the pilot establishment of plant use at Bwindi Impenetrable National Park. The aim of the establishment of plant use was as a mechanism

[4]Bwindi is the local name for the forest meaning "darkness" whereas the Impenetrable Forest is the nickname (later to become official), given by the colonial surveyors, due to the thick vegetation and rugged terrain. Both names were retained in the National Park name and are used, both together and alone, in the text.

to benefit adjacent communities and build a more secure future for this protected area through gaining local support.

1.1 Conservation in Uganda

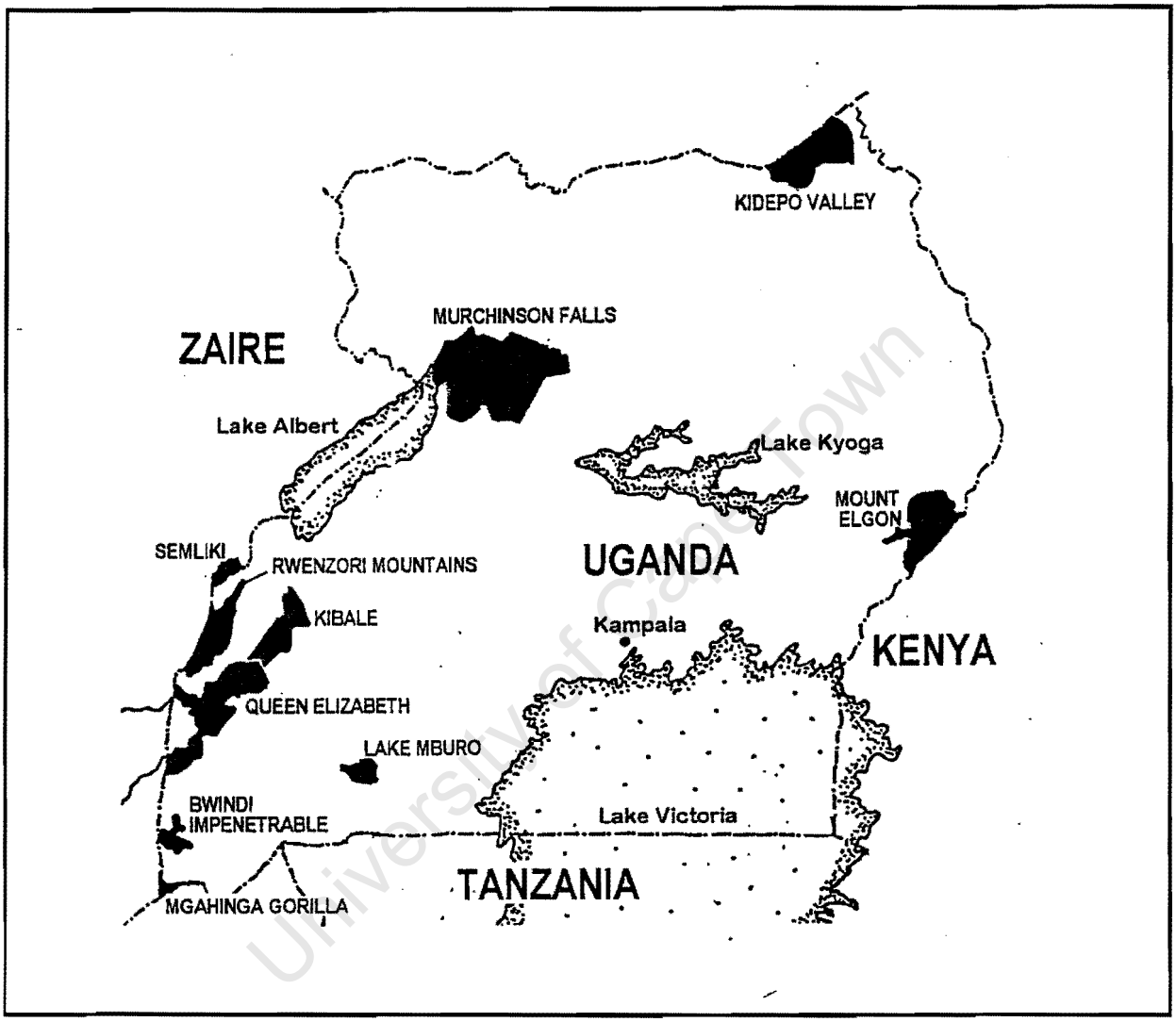

Figure 1 Uganda's National Parks

Uganda has been actively rebuilding its biodiversity conservation efforts. Since the National Resistance Movement came to power in 1986, the country has been revising its conservation legislation, policies, protected area network and their management. A major change has been the recognition that local communities need to benefit from conservation if they are to contribute to it. Uganda has been experimenting with ways to increase the flow of benefits to communities (Wild and Mutebi, 1996; Scott, 1998; Infield and Adams, 1999; Infield and Namara, 2001; Adams and Infield; 2001). The limited use of park plant

resources is one such experiment, and this thesis documents the establishment of resource use from two national parks in the southwest of Uganda.

Uganda has ten national parks (Figure 1). Four are savannahs, two are lowland forests and four are Afromontane forests. This thesis is concerned with the Bwindi Impenetrable National Park and to a lesser extent the Mgahinga Gorilla National Park, both Afromontane forests. Activities at each park have been exploring the new approaches. At Bwindi progress with resource use has contributed to national level policy developments and the piloting of activities at other parks.

1.1.1 Conservation policies and politics of community

The early history of Ugandan conservation follows the pattern of many British Colonies and Protectorates. In the early part of the century Uganda's Forest and Game Departments were established to manage and exploit timber and wildlife resources, with a strong conservation emphasis (Kayanja and Douglas-Hamilton, 1984). The balance of exploitation versus conservation expressed by these institutions and their supporting policy and legislation has swung back and forth over the decades (Howard, 1991; Kamugisha, 1993). In 1952 Uganda National Parks was established with an emphasis on wildlife (large mammal) conservation. Use within the first three parks was restricted to tourism and this meant the exclusion and in some cases removal of neighbouring communities (Calhoun, 1991). The 1952 Act ignored community livelihoods and being openly confrontational, was difficult to sustain (Kamugisha, 1993). In its early implementation, community benefits and local sensitivity were, however, emphasised (Kayanja and Douglas-Hamilton, 1984). Post independence civil war prevented progress in conservation activities and during this period there was minimal protection, widespread poaching, encroachment and overuse of resources in all protected areas (Kayanja and Douglas-Hamilton, 1984; UNEP, 1988; Howard, 1991). In addition there was widespread deforestation and land use change outside protected areas.

Since 1986 significant conservation changes have taken place. Protection of many areas has increased and poaching and resource use largely controlled. Encroachers have been evicted from many protected areas (in some cases with considerable controversy

(Colchester, 1997)). Six Forest Reserves were gazetted as National Parks in the two and a half years between May 1991 and September 1993. Not least of these changes was that Uganda National Parks moved away from pure protectionist policies and made significant moves toward participatory conservation, a trend that has continued within Uganda Wildlife Authority.

The Government of the National Resistance Movement that took power in 1996 introduced a grass roots system of political administration. This system, made up of Resistance Councils (RCs)[5], builds up from village to parish to Sub-County level and beyond. Elections are held at each level and an executive of nine people nominated. The Resistance Council system, which was accepted over much of the country, has devolved real decision making to the village level, and facilitated community based natural resource management (see section 3.2.1.10).

1.1.2 Background to Bwindi and Mgahinga

Both parks are in the Kigezi region, in the southwest of the country, (Figure 2). Both were forest reserves, gazetted in 1932 (Bwindi FR) and 1941 (Mgahinga FR), and Animal Sanctuaries, gazetted in 1930 (Mgahinga) and 1964 (Bwindi). Mgahinga was upgraded to a Game Reserve in 1964. Both forests were converted to national parks in 1991. The conservation importance of both sites has been well documented (Butynski, 1984; Struhsaker, 1987; Howard, 1991; Cunningham *et al.*, 1993; Butynski and Kalina, 1993; Cunningham, 1996). Afromontane forests are the rarest vegetation type on the continent (White, 1993). Both forests support the endangered mountain gorilla (*Gorilla gorilla beringei*[6]), as well as other rare primates. Bwindi is one of the richest forests in east Africa, with 205 species of tree, 10 of which are found nowhere else in Uganda, 336 species of bird, including 6 red data book species as well as 202 species of butterfly (Kalina and Butynski, 1992; Butynski and Kalina, 1993; Kakuru, 1993). Mgahinga

[5] In 1997 the name of these councils changed from Resistance Councils to Local Councils.

[6] There is currently some dispute over the sub-specific classification of the Bwindi gorilla population (McNeilage et al, 2001). In this thesis, however, in the absence of taxonomic clarification the conventional classification is used.

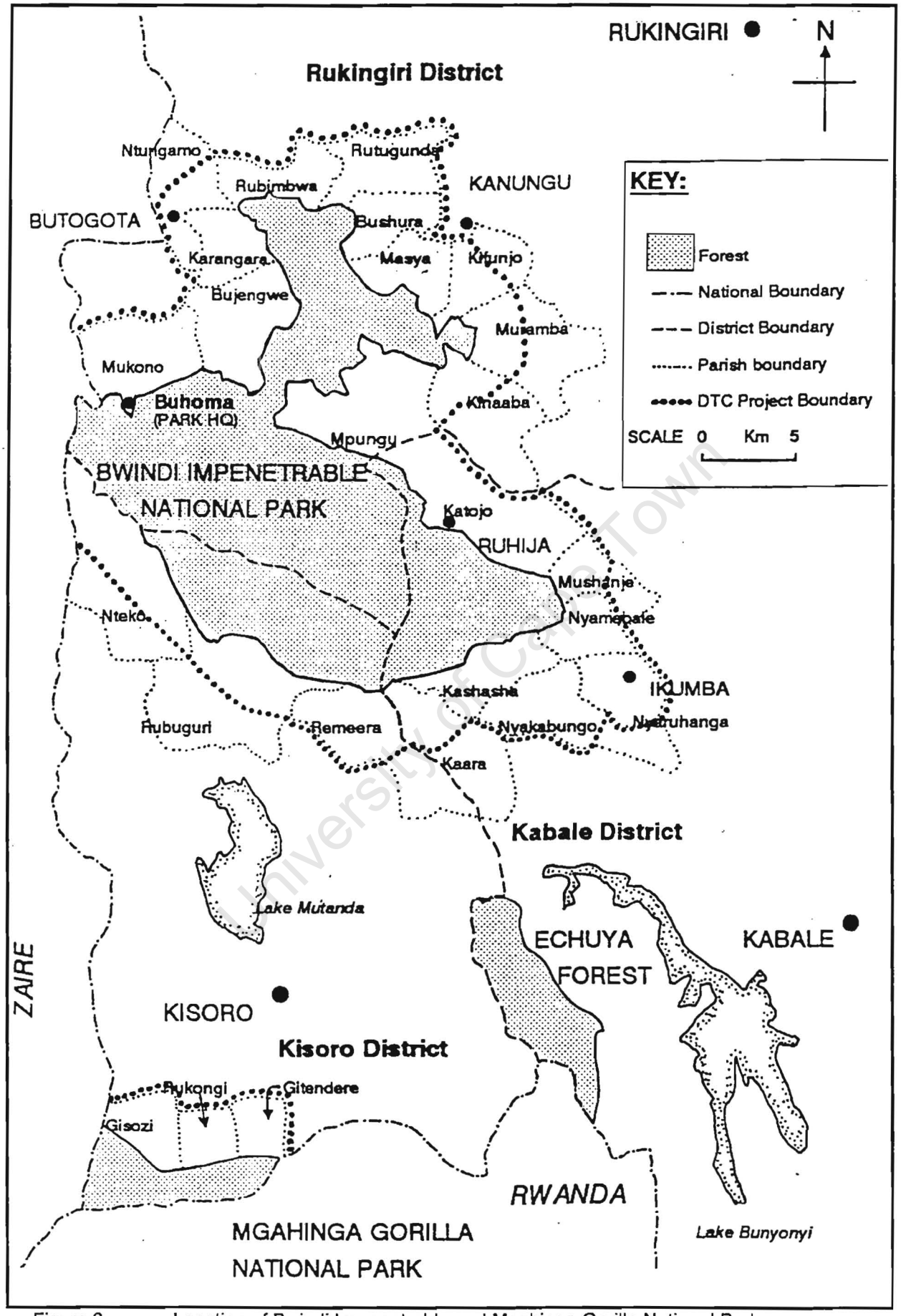

Figure 2 Location of Bwindi Impenetrable and Mgahinga Gorilla National Parks

Gorilla National Park is less well known but has Afro-alpine vegetation and red data book bird species, and forms part of the Virunga Conservation Area, which extends into Rwanda and Zaire[7] (Kalina, 1993; Wilson, 1993).

The forests of the area have a long history of human occupation that probably dates to c.32,000-47,000 years ago (Cunningham, 1996). Forest clearance for agriculture is thought to have begun about 2,200 years ago (Taylor, 1990) and Bantu speaking peoples arrived c.2,000 years ago with iron smelting technology, and were probably responsible for this clearance.

Both parks are surrounded by high human population densities that reach 200-400 people per km^2 and are among the highest on the continent. Like most areas of the world there has been rapid population increase, and the area has a 50-year history of emigration to other parts of the country, which continues today (CARE, 1994). Land-use is intensive with sorghum, millet, wheat, Irish potatoes, beans, peas, bananas, and cassava the main crops grown. The wide crop variety reflects the altitude range (1100m-2600m). Far from major centres and with little opportunity for sale outside the area, crops are sold in weekly markets. Three main ethnic groups live next to the forests, the Bakiga, the Bafumbira and the Batwa. The Bakiga predominate around Bwindi and the Bafumbira around Mgahinga. The Bakiga and the Bafumbira are Bantu agriculturists. The Batwa were previously forest dwellers, dependent on hunting and gathering. They have a long history of trading food for forest products with their neighbours.

Originally there were both Batwa and Bakiga households settled in many parts of Bwindi Forest. Old settlement sites are often secondary forest planted with species of religious significance (*Erythrina abyssinica* (Ekiiko) and *Ficus sp.*(Ekitooma)). People were gradually moved out of the forest reserve over a period of many years and the actual pattern of removal is not clear. In Mukono Parish, oral history has it, that first the community members grouped together and moved to one site near the forest edge, to reduce leopard attack on livestock. Later the Forest Department negotiated a move from the gazetted forest to other, then forested, land nearby.

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[7] Now the Democratic Republic of Congo, the name Zaire is retained where historically appropriate.

The Batwa remained in the forest longer, being more dependent on it than other groups. One hundred Batwa were living nomadically in the forest in 1961 (Leggat and Osmaston, 1961). Local reports suggest the Forest Department moved the Batwa out in 1964, although this is likely to have been a gradual process. In discussions with the Batwa community in Rutugunda Parish, they say none of the current generations have ever lived permanently in the forest but their grandparents used to. Batwa still do live temporarily and illegally in the forest and it is possible that some come from Zaire. Using the forest as a base to rustle livestock has caused the Batwa to be increasingly unpopular with their neighbours. The Batwa own no land and "squat" on the "citizens" land (their expression) and are given food by them. In return they do agricultural work and collect items from the forest. The closing of the forest to resource use has further weakened the position of the

Batwa as they have little access to essential materials. Their landlords fearful of permanent occupation of their land and were accommodating them less readily. The Batwa have, in consequence, been squeezed between conservation on the one hand and development on the other[8].

1.1.3 Management and past use at Bwindi and Mgahinga

When Bwindi became a Forest Reserve it formed the central part of an extensive area of forest that extended into Zaire. The forestland outside the forest reserve was held under customary tenure by individual families and was gradually cleared for timber and agriculture. Air-photo analysis for the Ugandan portion of the forest has shown that 29% of the forest was cleared between 1954 and 1991 (Scott, 1992). The Zaire part of the forest has virtually all gone and the total area cleared during the last 40 years is likely to be close to 50%. There is virtually no forest now remaining outside the gazetted forest boundary.

Following independence the Forest and Game Departments (see section 1.1.4) managed the forests under the Forest and Game Acts 1964. Both reserves had Forest Department Working Plans (Leggat and Osmaston, 1961; Kingston, 1967). At Bwindi timber

[8] Over the last five years a programme has been implemented by the Mgahinga and Bwindi Impenetrable Forest Conservation Trust to improve the welfare of the Batwa.

exploitation was limited to certain "restricted species", felled by licensed pitsawyers. Minor forest products were exploited under the Forest Act of 1964, which had provisions for the use of these products (Leggat and Osmaston, 1961; Butynski, 1984; Howard, 1991; Cunningham, 1996). Use of some products, particularly the climbers, was controlled by the issue of a free permit by the forest guards. The guards assessed the number of permits the resource could sustain. In the case of medicinal plants there was no control over collection (Tumwesiimire pers.com.).

At Mgahinga the main resource harvested was bamboo (*Sinarundinaria alpina*). From 1940-1950 harvests were said to have been very large (Kingston, 1967). The forest reserve was closed from 1950-1955 to prevent over cutting and encourage on-farm cultivation of bamboo. From 1955 the bamboo was divided into coups, with a limit to the number of harvesters, and quantities they could cut. Harvesting was allowed two days per week. Rapid court action and heavy fines followed illegal cutting. Applications for free bamboo had to be confirmed through the Chiefs. Use of other non-timber products was unrestricted (Kingston, 1967).

When current conservation initiatives started it was found that implementation of the Acts and the working plan was ineffective at Bwindi (Butynski, 1984). Pitsawing both legal and illegal, gold mining, beekeeping and hunting were out of control and, at Mgahinga, part of the Forest Reserve had be degazetted, and 220 families had settled in the area despite it remaining a Game Reserve (Yeoman *et al.*, 1990; Infield and Adams, 1999). Butynski (1984) found the main reason for ineffective control was inadequacies in the Acts and the lack of financial and logistical support to staff of both Departments. For example, by 1988 the salaries of the Forest Department staff stood at only 0.4% of the 1962 level (Howard, 1991). This removed the incentive to function effectively and provided the incentive for illegal use. Agricultural clearance and overexploitation of the forests and forest fires led to losses in biodiversity (Butynski, 1984). For example in his survey Butynski's 1983 to 1984 found that 6% of the $1km^2$ squares in the forest had evidence of fires (based on a sample 38% of $1km^2$ squares), in February 1983 two fires covered an area approximately 1ha in extent each, and he observed a further fifteen separate fires burning in July 1984. Butynski considered all the fires to be caused by human activity and found no evidence of lightening strikes as a cause of fire. Evidence of human activity was found in 84% of the 38% of

1km^2 squares surveyed. This result was similar to a previous survey carried by Harcourt in 1981 when evidence of human activities was found in 85% of forest blocks (Harcourt, 1981, Butynski, 1984). Butynski considered that probably no area of the reserve was free of disturbance. Between 512 and 1049 people entered the forest every day, and while many were passing through on the roads, 45% were considered to be carrying out illegal activities mostly removing materials from the forest (Butynski, 1984, Table 1). Butynski (1984) considered the exploitation of the forest resources was proceeding at a high and uncontrolled level, and that the objectives of the 1961 –1971 working plan were not met and the Forest and Game Acts were not being respected. Of twelve forests surveyed subsequently by Howard (1991) Bwindi Forest had one of the lowest areas considered to be undisturbed at only 9.6% of the forest area, with 61% considered intensively pitsawn, the most intensively pitsawn forest in Uganda[9].

Illegal activities	**Nos. of people**
Illegal pit-sawyers and porters	80-160
Fuelwood bamboo and pole collectors	25 - 50
Beekeepers and honey hunters	10 - 20
Miners	100 - 200
Poachers	20 - 40
Herdsmen	5 - 10
Total	**240 - 280**

Table 1 Estimate of the daily mean number of people in the Impenetrable Forest according to their primary activities in 1983.

In 1986 the Impenetrable Forest Conservation Project funded by the World Wide Fund for Nature (WWF) was established and supported the Game Department in increased protection activities at Bwindi. Later, an Impenetrable Forest Conservation Project sub project, the Gorilla Game Reserve Project carried out similar work at Mgahinga. There were considerable conservation successes. Consumptive exploitation at both forests was stopped. Illegal activities were reduced and brought under control. The 220 families in Mgahinga were moved out and the boundaries of both parks demarcated. Conservation successes came, however, at considerable cost to local communities. In recognition of the need to support communities WWF and CARE

[9] Other forests were mechanically harvested, which is considered more disruptive, but over a smaller

International developed the Development through Conservation project, implemented by CARE and the organisation's first ICDP. The project aim was to support the conservation of the two national parks by promoting appropriate development of the adjacent communities and has a number of programmes to achieve this (Butynski and Kalina, 1993; Wild, 1995). It is the Development Through Conservation project that has taken the lead in establishing resource use.

1.1.4 Conservation organizations and their roles in resource use

The following is a brief description of the key conservation players active at Bwindi and Mgahinga during the period of this study.

The **Forest Department** is a government department under the Ministry of Natural Resources. The Forest Department is responsible for management of the country's forest estate. It was the managing authority of Bwindi and Mgahinga Forests from the 1930's until 1991.

The **Game Department** was the government department under the Ministry of Tourism Wildlife and Antiquities, responsible for Game Reserves and Game Sanctuaries as well as wildlife on public land. It was the secondary manager of the forests from 1930's until 1991. It merged with Uganda National Parks in 1995 as the Ugandan Wildlife Authority.

Uganda National Parks (UNP), was at the time of this study, the government parastatal, under Ministry of Tourism Wildlife and Antiquities, responsible for the management of the country's national parks. It assumed management of both Bwindi and Mgahinga forests in 1991 when they were gazetted national parks. Uganda National Parks was the lead agency in implementing resource use and had overall responsibility for the activity. In 1995 it merged with the Game Department to become the **Uganda Wildlife Authority**. During this discussion the names Uganda National Parks, Game Department and Uganda Wildlife Authority are used reflecting the distinct institutional arrangements of that time.

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proportion of each forest.

The **Impenetrable Forest Conservation Project (IFCP)** was a WWF project established in 1986 to support the Game and Forest Departments in conservation and gorilla research. It initiated the Development Through Conservation project and established a sub-project at Mgahinga named the **Gorilla Game Reserve Project** that later became the **Mgahinga Gorilla National Park Project**. The Impenetrable Forest Conservation Project later became the Institute of Tropical Forest Conservation.

The **Institute of Tropical Forest Conservation (ITFC)** was established in 1991 as a faculty and research facility of Mbarara University Institute of Science and Technology. The institute's primary objectives are; i) to preserve the biological diversity and the ecological well being of Uganda's tropical forests, and to ii) to enhance the environmental quality of life of the people of Uganda. The Institute has developed and is implementing a research and monitoring system for multiple-use and product substitution.

The **Development Through Conservation Project (DTC)** is an integrated conservation and development project managed by CARE International. It supports both conservation and appropriate development activities around Bwindi and Mgahinga. Among the project objectives were the development of low impact resource use and the establishment of buffer zones in support of UNP. It is also supporting sustainable agriculture, agroforestry and other development activities. Originally developed as a joint initiative between WWF and CARE International it was initiated in 1987 and became operational in 1988. From 1992 it was implemented solely by CARE. It was CARE's first ICDP and is still operational as of 2001.

The **International Gorilla Conservation Programme (IGCP)** is a collaborative programme supported by African Wildlife Foundation, WWF and the Fauna and Flora Preservation Society, with the aim of conserving gorillas. At Bwindi it is supporting Uganda National Parks in the establishment of gorilla-based tourism. It assisted with the development of a well controlled multiple use program me that was consistent with conservation. It provided guidance on methods to reduce the risks of disease transmission between resource users and gorillas and on prevention of behavioural disturbance or range alterations of gorilla groups.

The **Park Management Advisory Committee** was a new Uganda National Parks initiated committee consisting of elected community representatives and local administrators to advise park management on issues related to the community. It has no executive powers but its recommendations were taken seriously. One was formed for each national park.

1.2 The first steps towards resource use

While the Game Department, Forest Department and the Impenetrable Forest Conservation Project were making efforts to control unsustainable resource use at Bwindi, there was no deliberate intention to stop all use, however, this is what actually occurred. Limited resource use was discussed at an early stage in renewed conservation efforts in the forests and was the remit of the Development Through Conservation project.

> "Ensure the sustainable utilisation of species and ecosystems: Low consumptive, in-forest buffer zones provide sustainable supply of forest products if extracted on a planned and regulated basis." (CARE, 1987).

The controlled use of resources was recommended during the first workshop on the conservation of Afromontane forests, held in Rwanda in 1989 (Vedder, 1989; Butynski, 1989). Shortly after Bwindi became a national park, the Institute of Tropical Forest Conservation recommended to Uganda National Parks that resource use be allowed. Trials were initiated and Uganda National Parks requested that 20% of the forest be identified for this purpose.

1.2.1 Preliminary surveys

Three preliminary studies were carried out to collect information on which to base multiple-use activities two at Bwindi and one at Mgahinga (Scott, 1992; Cunningham *et al.*, 1993; Cunningham, 1996). In 1991 Scott established species demand at Bwindi using random household questionnaires (Scott, 1992). Estimates of forest abundance for the highest demanded species were carried out. Potential multiple-use areas were surveyed and most of these were adopted in the draft management plan (Wild and Serugo, 1993; Figure 9). In 1992 Cunningham carried out the second survey which examined species ecology, botanically identified known species, and made recommendations on resource categories

and some individual species for use (Cunningham, 1996). Cunningham recommended the establishment of low impact specialist resource use from multiple-use zones inside Bwindi and the provision of substitutes to high impact, general use of forest resources, on farms outside. This "use and substitute" principle is a key strategy for using plant use as a conservation tool. Beekeeping in the forest ceased as a legal activity when the forest became a national park, although the hives were not removed. Before the survey by Cunningham the process of formalising and re-starting beekeeping had begun. Cunningham (1996) endorsed this new process and recommended to proceed with extractive utilisation of medicinal and basketry plants. Permission was given by Uganda National Parks headquarters for the extractive utilisation of these categories of plant resources in the forest adjacent to three pilot parishes. The study at Mgahinga (Cunningham *et al.*, 1993) was carried out prior to the management planning process for that national park.

1.3 Parks, wilderness and resource use - the global conservation debate

Having introduced the background to the study and the preliminary steps taken to initiate resource use, this section reviews the international debate regarding conservation strategies.

1.3.1 Protection, conflict and indigenous peoples

Over the past 20 years there has been international debate over conservation strategies. Often this has developed into a duality between nature and people orientated conservation (Peres, 1994; Kremen *et al.*1994). A response to alarming habitat and species losses has been a tripling of the area and numbers of protected areas (Kamstra, 1994; Stevens 1997; Brandon *et al.*, 1998) with significant effort into increased protection, and increased military style park protection forces. Park adjacent communities have, however, suffered from increased protection (Bell, 1987; West and Brechin, 1991; Wells and Brandon, 1992; Colchester, 1997; Pimbert and Pretty, 1997). Local communities have been hostile to conservation efforts as these reduced their access to resources, employment and income. In many cases they have been evicted from their own or conservation lands with considerable social disruption. In the worst Ugandan example the cultural integrity of a whole people,

the Ik of Kidepo National Park, has been put at risk (Calhoun, 1991). That open conflict has occurred between protected area authorities and local communities (particularly at national parks) has been recognised for some time.

> "The crisis confronting the present system of protected areas in Africa is largely due to the fact that the system is a continuation of conservation policies that fail to recognise the needs, fears and values of local people." (Lusigi, 1984).

The conflicts that this situation has produced are now better documented (West and Brechin, 1991; Western and Wright, 1994; Colchester, 1997) rather than ignored, and gradually conservation organisations have recognised these problems and are trying to become more socially responsive (Kamstra, 1994). It is now generally recognised that local communities should not have to pay for conservation values that are accrued at the national (income, meeting international obligations) or global (existence values) level (McNeely, 1998).

A general worldwide trend during the nineteenth and twentieth centuries was the increasing control over the land by the state (Alcorn, 1993; Stevens, 1997; Poffenberger and Singh, 1996). In Uganda, the first forestry and wildlife legislation was enacted in the 1890's. This began a process of state environmental control, which, over the following fifty years, established a system of forest and game reserves (Kayanja and Douglas-Hamilton, 1984). This removed the rights of indigenous communities (Kamugisha, 1993) and it has been argued that this process has, in some countries, actually led to the loss of biodiversity (Alcorn, 1993). Hesitant steps are now being taken, in many countries, to reverse this trend and return rights to local communities. Many biologists have called for an alliance between indigenous peoples, conservation organisations and governments in an attempt to stem the destruction of natural areas in general, and of forests in particular (Alcorn, 1993).

1.3.2 The wilderness reviewed

Another realisation that is becoming current is that "wilderness" or areas that have had no human impact is a myth and that the imprint of humans can be found in the most seemingly untouched places (Adams and McShane, 1992; McNeely, 1994). Wilderness is a concept that is deeply rooted in the European and North American psyche and which has shaped the development of both continents. In a thorough description of the concept and its

development, Roderick Nash (1982) argues that the origin of wilderness as an idea can be traced back to the Judeo-Christian tradition and before. In early colonial American history the wilderness was to be conquered, subdued and tamed, and this is what effectively happened at the American 'frontier'. During the nineteenth century a romantic counter movement arose from the cities, inspired by writers and philosophers such as Thoreau. This movement placed a value on wilderness, which led eventually to the establishment of the Yellowstone National Park in 1871, and later the Adirondack Forest Preserve in 1894 (Nash, 1982; Stevens 1997a).

The American model of national parks as wilderness areas with little or no human impact is the model that has become current around the world and was, until recently, reflected in the IUCN definitions of protected areas (IUCN, 1994b; Ishwaran, 1994. This concept of national parks was spread to much of the developing world through colonial governments, who established protected area systems in many countries. The appropriateness of this model and the wilderness concept has now been questioned (West and Brechin, 1991; Adams and McShane, 1992; Western and Wright 1994, Colchester, 1997; Pimbert and Pretty, 1997, Stevens 1977a).

The wilderness idea has also held sway over African conservation, and to Europeans, Africa has long held an aura of the wilderness.

> "To an eager audience steeped in romanticism, and to the generations that followed, the tales of the explorers created an Africa that was both paradise and wilderness, a place of spectacular but savage beauty. Europeans invented a mythical Africa, which soon claimed a place of privilege in the Western imagination. We cling to our faith in Africa as a glorious Eden for wildlife." (Adams and McShane, 1992).

It has been argued that the arrival of Europeans also coincided with unusually low human and cattle populations, and unusually high animal populations, further creating the impression of wilderness full of wildlife (Bell 1987).

Interestingly, the National Parks in Uganda were created at about the same time as those of Britain during the 1950's. In Uganda, a British protectorate at the time, the national parks followed the American model, whereas in Britain a different model was chosen, which reflected the realities of wildlife rich areas in Europe. Virtually nowhere in Britain can be

considered to be without significant human impact and most habitats are considered semi-natural. The long association of local communities with the landscape is recognised and much of conservation management is geared to mimicking or recreating traditional farming and woodland management practices. A different type of park has therefore been established, considered a "protected landscape". Different areas are zoned, ranging from wildlife rich areas to intensively farmed areas and villages. This model of national parks, which also occurs in other parts of Europe (Tassi, 1984), is now receiving increased attention as an alternative and more people orientated approach to parks (West and Brechin, 1991; Colchester, 1997).

In comparison to Europe the impact of people on natural habitats has been lower in other areas of the world. It is, however, being increasingly recognised that even "pristine habitats" may have been significantly altered or managed by people.

> "Virtually all of our planet's forests have been affected by the cultural patterns of human use, and the resulting landscape is an ever-changing mosaic of unmanaged and managed patches of habitat, which vary in size, shape and arrangement...Evidence is building to support the view that very few of today's forests anywhere in the world can be considered pristine, virgin, or even primary, and that conserving biological diversity requires a far more subtle appreciation of human and natural influences."(McNeely, 1994).

1.3.3 Conservation with development - a new model for conservation

It is now, therefore, appreciated that local people have a) played a role in most natural areas, and b) they should not bear the national and global cost of conservation. An alternative conservation model, "integrated conservation and development (ICD)" has been proposed and implemented (Wells and Brandon, 1992; Brown and Wyckoff-Baird, 1992; Kamstra, 1994; Alpert, 1996; Wells *et al.* 1999). The integrated conservation and development approach attempts to answer the following questions.

- Can the burden of conservation on local communities be reduced?
- Can ways be found for park authorities and conservation agencies to work more constructively with communities, and what institutional arrangements are necessary?
- Can land be managed so as to reconcile conservation with development?

To answer the first question the idea of "benefit sharing" has been developed. Ways of getting benefits to local communities that have been suggested include tourist revenue sharing, tourism related enterprises, agroforestry, agriculture, rural development, conservation education and the use of state owned resources. It is the use of state owned resources that is the subject of this thesis.

Early examples of resource use within conservation areas come from the cutting of wetland species in Umfolozi Game Reserve and the Greater St. Lucia Wetland Park in South Africa, which began in the 1970's (Cunningham pers.com.). The best-known African resource use initiative is the Zimbabwe CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) programme, which has allowed the community use, or benefit from the use, of state owned wild mammals found on communal land (Metcalfe, 1994). The cutting of thatch grass from the Royal Chitwan National Park in Nepal is a well-known example of resource use from Asia (Wells and Brandon, 1992). In Europe, the maintenance of traditional resource use is often the main aim of management within National Parks. Interest is growing in using resource use as a conservation tool in forests (Crafter *et al.*, 1996). Identifying resource use as a conservation strategy for forests has led to a revived interest in non-timber forest products (FAO, 1991; Plotkin and Famolare, 1992; Godoy and Bawa, 1993). Also recognised is the role non-timber forest products can play in community development (Falconer and Koppel, 1990), although the values of plants and animals harvested form the forest is probably not as high as first estimated (Godoy and Bawa, 1993). Hall and Bawa (1993) and Peters (1994) have expressed the concern that much of the harvest of non-timber forest resources is carried out on a destructive and unsustainable basis, and the actual harvests of many of these resources are in decline. In acknowledging the great interest in the sustainable use of wild species as a conservation tool IUCN has developed draft guidelines on the ecological sustainability of the use of wild species (IUCN, 1993). The guidelines are now part of IUCN policy and are being tested in the context of enhancing the conservation of species and habitats (IUCNa, 1994). To support the sustainable community use of forests both for timber and non-timber products attention has been paid to modifying forestry techniques. Field manuals have been produced in support of the sustainable harvest of non-timber plant resources in tropical moist forests (Peters, 1994), and for diagnosis tools for joint management

(Poffenberger *et al.*, 1992). Other work has addressed the impact of harvesting on non-timber forest products and the establishment of monitoring systems, (Hall and Bawa, 1993) while Carter (1996), has reviewed efforts at participatory resource assessment as part of establishing controlled forest use.

1.3.4 Participation, indigenous knowledge and buffer zones

In an effort to involve communities in conservation a number of approaches have emerged including encouraging community participation and valuing indigenous knowledge. Within the development sphere there has been progress in defining what participation actually means and the techniques that can be employed to encourage participation on the ground (Lane, 1991; Chambers, 1992; World Bank, 1994; Little, 1994), as well as its limits (Little, 1994; Cleaver, 1999; Kuhn, 2000). The need to involve people in protected area management has also been recognised for a number of years (Batisse, 1984; McNeely and Millar, 1984; Dasmann, 1984; Jeffries, 1984; Garrett, 1984; MacKinnon *et al.*, 1986). Participation in conservation is now part of most conservation plans but the actual methods of achieving this are not well developed (Wells and Brandon, 1992; Kamstra, 1994). An early call for more involvement of local communities in park planning came from Blower (1984) who stated that local people would oppose the establishment of parks unless 'strenuous and imaginative efforts are made from the start to involve them in planning and development of the park'. Management planning guidance produced at a similar time gave some emphasis to consultation with local communities and saw management plans as a tool for communication with local communities (MacKinnon *et al.*, 1986) but had not taken the step of including community members on the planning team itself.

Little (1994) in a review of participation specifically in a biodiversity conservation context highlights a number of important areas in for consideration in relation to participation and these include:

- The importance of a conducive institutional environment.
- Early community participation in the programme cycle.
- Recognition of and working with existing local institutions.

- When local priorities are not compatible with specific conservation objectives economic compensation must be a part of negotiations.
- Participatory conservation efforts rely too much on rapid resource appraisal and do not make the necessary commitment to systematic data collection
- Local participation is a time-consuming process that does not lend itself easily to the institutional environments of ministries donor agencies and NGO's dependant on donor funding.
- Excessive claims are sometimes made about the merits of participation.

Indigenous knowledge has been undervalued in the past, particularly by governments and researchers, and this view is now changing:

> "Indigenous knowledge, particularly in the African context, has long been ignored and maligned by outsiders. Today, however a growing number of African governments and international development agencies are recognising that local level knowledge and organisations provide the foundation for participatory approaches to development that are both cost effective and sustainable." (Warren, 1995).

Protected areas in areas of high human population densities are often referred to as islands in a sea of rural farmers. In terms of knowledge of the resource the image is in fact quite different. Young graduate managers with inadequate training, no experience and precious little support can be thought of as islands of ignorance in a sea of knowledge. Local resource users usually have extensive and detailed knowledge of the specific area and the species found within it (Cunningham, 1992). Increasing attention also is being paid to the way that local people describe and manage local ecosystems (Ruddle, 1994; Harp, 1994; Toledo *et al.*, 1994; Haverkort and Millar, 1994; Berkes *et al.*, 1998).

The first serious attempt to integrate conservation and development, and to take people's needs into account was the buffer zone concept. Originally suggested as key component of the biosphere reserve and part of the Man and the Biosphere Programme (Batisse, 1983; Wells and Brandon, 1992) buffer zones were much discussed during the 1981 Congress on National Parks (McNeely and Millar, 1984). An output of the congress was a detailed description of the principles of buffer zones (MacKinnon *et al.*, 1986) and many projects

over the last decade have proposed or implemented buffer zones. These were originally called buffer zone projects, and were later renamed integrated conservation and development projects (ICDP's).

1.3.5 Common property rights, land tenure and community institutions

Community access to the resources within protected areas and their buffer zones brings us to a discussion of land tenure, property and access rights and community level institutions that control resources use. These issues, especially common property rights, have received much attention over the last three decades.

Thirty years ago Garrett Hardin initiated a long running debate by providing a model for the degradation of natural resources under common management that he named the "tragedy of the commons" (Hardin, 1968). The tragedy of the commons theory holds that in a situation of open access to a resource it is to the advantage of an individual user to extract as much of the resource as possible, as the cost of such behaviour is spread across all the users. Common or shared use of a resource will according to Hardin inevitably lead to the over use and degradation of the resource. Hardin went on to advocate for either privatisation or state control of these resources to prevent this tragedy. This theory has been extremely influential (McCay and Acheson, 1987; Wade, 1987; Feeny *et. al*, 1990; Knudsen, 1995,) and became a central part of the conventional wisdom influencing policies towards the management of natural resources and the establishment of many state controlled protected areas. It has also precipitated much study into the question of the commons (Feeny *et. al*, 1990; Knudsen, 1995). In particular a number of authors have questioned whether resource degradation is really inevitable under conditions of shared use. This question is of particular interest regarding the restarting resource use, in the Impenetrable Forest, after a period of no use which itself was preceded a period of poorly controlled use and resource degradation. Before discussing the challenges to Hardin I will discuss the definition of terms and then alternative classifications of property regimes.

1.3.5.1 Definition of terms

Unfortunately, in discussions over common resources, there is considerable confusion over the use of certain terms (Knudsen, 1995). Some of these terms are, therefore, discussed and defined and I have returned to basic dictionary definitions to build up a better understanding of terminology.

A 'resource' is a stock of something (material or intellectual) that can be drawn upon as a means of support (McLeod, 1987), and so defines its relation to human needs. In this discussion by resource, is meant a product of land or sea that supports human well being and can also be a source of economic wealth, for example, forests, woodland, grassland, plants, animals, fish, water or soil. A 'property' is something that is owned (McLeod, 1987)(which can including a resource), and 'common' refers to the fact that the property is owned by all or several people (McLeod, 1987). Using dictionary definitions, therefore, a 'common property resource' can therefore be defined as a product of land or sea that is owned by all or several people.

According to Wade (1987) common property resources lie on a continuum in between 'private property' and 'no-property'. Private property that is exclusive possession, is not public but reserved for, or belonging to an individual or group of individuals only, and where the owners have the right to exclude others. No-property is by definition not owned, and for example the atmosphere or an ocean fisheries have been describe as no-property (Wade, 1987). The term 'no-property resource' is, however, not used (although the term 'non-property regime' is Wade, 1987). Possibly the term 'unowned resource' would be clearer. State property is also widely discussed (Wade, 1997; Feeny *et al.*1990; Knudsen, 1995) and this is considered another category of ownership, but it is not clear how it fits onto the continuum of private ownership to unowned. There is also some confusion when the term "public" is used variously to mean state or common property.

When considering land, full ownership or possession is not ever totally exclusive, even though the term 'own' has itself the connotation of exclusive possession, at least in common usage. The nation state, however, maintains rights over private property (Lynch and Alcorn, 1994), even if it is that of compulsory purchase and some restrictions as to use

are enforced. In a number of East African countries, ultimate ownership of all land is vested in the state. Tenure is another word used to describe possession or ownership. Tenure also includes a sense of the length of time of ownership and implies a property that endures beyond that of its owner(s) (McLeod 1987). "Rights" is another important term used and can be defined as a "claim over or title to, at least in our discussion, land or the products (resources) of land; soil, wood, animals, water and others. Rights are broader than tenure (property or ownership rights) as there are rights that do not include ownership, for example, rights of use or access. Some authors, however, use the term tenure to be synonymous with right i.e. "Tenurial rights" (Lynch and Alcorn, 1994), which includes not only ownership but also management rights. The direct linking of tenure with ownership may be an oversimplification, and Lynch and Alcorn (1994) describe tenure as encompassing a "bundle" of rights and responsibilities.

One recurrent recommendation in consideration of common property is the importance of differentiating between "resource" and "regime" (Wade, 1997; Feeny *et al.*1990; Knudsen, 1995). In our context a regime is a system of government or administration over a particular resource. The preference of the some authors is to use the term common property regime not 'common property resource' due to the inherent ambiguity and incorrectness of the latter term (Bromley, 1991 in, and supported by, Knudsen, 1995). These authors, however, do not clarify where the ambiguity lies. If we refer to the term as defined as earlier 'as a product of land or sea which is owned by all or several people', the ambiguity can be seen in the sense, also discussed, earlier that something that is owned by all may not in-fact be owned, and is no-property or unowned. However, by removing the 'all', a useful albeit basic, definition of common property resources emerges as follows 'a product of land or sea which is owned by several people'. This distinction between 'all people" and "several people", is a critical one in re-examining the theories of collective action and we will return to this later. Private property owned by a group of people, overlaps with common property owned by several people and indeed common property is defined by some authors a subset of private property (Lynch and Alcorn, 1994).

Some types of common property are held to possess two important characteristics (Feeny *et al.*1990; Knudsen, 1995), excludability and subtractability:

1. One characteristic is a difficulty to control access or use, i.e. a low ability to exclude others, referred to as excludability.

2. The other characteristic of the property is that it can only be used once. When one user has cut a tree, or caught an antelope or a fish that individual plant or animal is not available to another user (although others may regenerate in time to replace them). This characteristic is termed subtractability. This character is in contrast to some common property resources, such as the signal provided by a lighthouse, which are not reduced by increasing use.

Therefore, resources in which it is difficult to exclude users and use itself reduces the availability of the resources to others is the particular class of common property resources that we are discussing. Given these two characteristics it is easy to see why the management of these resources is difficult and controversial.

Some authors (Wade, 1987; Knudsen, 1995) favour the term "common pool resources" to differentiate between common property resources which possess the characters of subtractability and excludability, from those that do not, while some authors prefer to continue to use the broader term 'common property resource' (Feeny *et al.*1990).

1.3.5.2 Classification of Common Property Regimes

To follow on from the definition of terms is to consider the differing ways of classifying property-rights regimes. Feeny *et al.*1990, suggest the following:

Open access, where there is an absence of clear or any property rights. This is the alternative and more widely used than the term 'non-property regime'.

Private property, where the rights of use and exclusion are vested in one or more individuals, including registered companies.

Communal property, is where an identifiable community of interdependent users use the resource. These users exclude others, while regulate themselves over use of the resource.

State property, where the rights to the resources are vested exclusively in the government, which make decisions regarding the access and use of the resources.

Lynch and Alcorn (1994) consider two fundamental flaws to this topology;

1. Private property is usually seen as synonymous with individual property.

2. This topology virtually requires that community-based tenurial systems that include both individual and groups must be disentangled and separated before any of these rights can be recognised by the nation-state concerned.

They suggest an alternative classification scheme that they claim has advantages for conceptualising and implementing improved laws and polices for community-based conservation. They propose the following four combinations; Private individual, private group, public individual and public group, where public is synonymous with state owned. What they are suggesting is that each combination refers to a "bundle of rights" and that these rights can overlap within the bounds of a particular area. While the previous topology of Feeny *et al.*(1990) is clearer in conceptualising property regimes, it is certainly common to have all four categories apply to a piece of land. In many situations in East Africa, state ownership has been imposed over and undermined pre-existing communal and private property arrangements (which are themselves often closely intermixed and grading), while the state's inability to enforce its new ownership has led to a near open access situation.

In recognition of the complexity of tenure arrangements, other authors have developed the concept of the 'tenure niche' (Nhira and Fortmann, 1993; Matose and Wily, 1996). The concept was originally developed by John Bruce (Bruce and Fortmann, 1989, in Nhira and Fortmann. 1993), and defined as follows; A tenurial niche can be describe as "property claims to certain categories of resources[10], by certain groups, on land under various kinds of tenure (Nhira and Fortmann, 1993) The authors went on to describe six tenurial niches in relation to forest and woodland management in Zimbabwe.

[10] The authors were specifically discussing trees.

1.3.5.3 Alternative theories of property rights

Returning now to the challenges to Hardin's theory, the last ten years has seen considerable attempts to reject, support or re-evaluate his tragedy of the commons (McCay and Acheson, 1987; Wade, 1997; Feeny, *et al.* 1990; Knudsen, 1995). Knudsen (1995) in what he aims to be a presentation of the "state-of-the-art" of research on common property regimes, lays out four analytical approaches to the study of property regimes and collective action. These are Game Theory, in which he includes the prisoners' dilemma model, the property rights school, the "revisionist approach" (i.e. revising Hardin) and the institutional approach of neoinstitutional economics.

The result of this is considerable complexity of analysis, and Knudsen's (1995) conclusion, in his comprehensive review, is that "common property is, as an object of study, blurred" and asks the question, " Is common property

a) behavioural relationship between men,

b) a question of agents and choice (solved by incentives and penalties),

c) a problem of markets and pricing,

d) a question of institutions?"

His own answer is, that all these modes of analysis need to be integrated, and that because Hardin favoured the economic rather than the contesting social paradigm of human behaviour, does not imply that he was wrong.

More pragmatically and appropriate to the development resource use from national parks in Uganda, Wade (1987) addressed himself to the assertion that the shared use of a resource inevitably led to its destruction, with privatisation or state intervention being the only solutions. He found it difficult to reconcile this assertion with his own research findings from South India. He finds, as do others (McCay and Acheson, 1987), that certain rural

communities have been able to develop and sustain locally based rules over restrained access to common property resources.

> "My findings, and those of many others contradict this [inevitable destruction] . We have many examples where villagers have established rules, monitored the condition of commons, monitored cheating and assigned punishment. We also have, of course, many more examples of cases where attempts to do this have failed, and where in the absence of state regulation or private property the commons has degenerated. But the successful cases of locally devised rule systems indicate that it is not necessary for regulation of the commons to be imposed from the outside." (Wade, 1987).

The tragedy of the commons is one of a number related pessimistic collective action theories, which is a variant of the prisoners' dilemma model (Wade, 1987; Knudsen, 1995). Collective action is action by more than one person directed towards the achievement of a common goal or the satisfaction of a common interest that cannot be obtained by an individual acting alone (Wade 1987). The prisoners' dilemma is summarised as follows. Two suspects are being separately interrogated about a crime they have jointly committed. They know that if they both stay silent they will receive a light prison sentence. If one stays silent while the other confesses the first will receive a medium prison sentence while the other goes free. If both confess they both receive a medium sentence. Each person can only choose once and they cannot change their choice. Their joint interest is not to confess, but the outcome is that they both confess to avoid the chance that they remain silent and receive a heavy sentence, while the confessing prisoner goes free.

The assumption of the prisoner' dilemma is the players do not know what the decision of the other players is making and that the game is played only once. As Wade (1987) points out that when we assume that the players can learn what decision the others are making, and can alter their own choices, then the rational strategy is in contrast to the simple prisoners' dilemma model, one of conditional co-operation. That is co-operate first and defect only if the others' defect. Additionally if players are able to negotiate changes in the rules of the game, then this is likely to lead to the development of penalties for cheating. These latter assumptions are much closer to the situation of community natural resource management arrangements.

Other and more sophisticated game theory models have been developed to analyse outcomes under different situations and these have strongly influenced the way that common property dilemmas are perceived (Knudsen, 1995). In Hardin's version, he likewise assumes that the individual herder has no information about the decisions made by other herders or the overall condition of the pastures. This assumption does not make sense in many rural settings in the developing world (Wade, 1987). Here, monitoring the condition of the commons, and of cheating is fairly easy (Wade, 1987; McCay and Acheson, 1987). Hardin also fails to make the distinction between situations of no property and situations of common property. He begins his argument by assuming 'a pasture open to all'. The case is quite different where a joint ownership unit exists, and access is open only with in the bounds of this unit. Here the chances of getting compliance with rules of restrained access are much better (Wade, 1987). Some authors do consider, however, common ownership is functionally equivalent to no ownership, where each individual takes as much as he or she wants; a view common from economics (Hodson *et al.*, 1994).

Hardin found that the only viable solution was "mutual coercion mutually agreed upon", and took it for granted that this must be done through an external authority such as the state. When the group is not overly large, however, then there is the likelihood of voluntary collective action (without selective punishments or inducements). This likelihood becomes much higher for small interest groups.

The success of the local groups in managing resources has been undermined over the last two or more centuries, following the European colonisation of many parts of the globe. There has been a gradual appropriation of property rights by the state and in some cases the state has eliminated all community-level tenurial security (Lynch and Alcorn, 1994; Poffenberger, 1994). Communal control, if it was present, has therefore been replaced by state control. In many countries, however, the state machinery has not been strong enough to actually maintain this state managed system (McCay and Acheson, 1987; Feeny *et al.*, 1990; Ostrom, 1990).

> "By insisting that biologically rich lands are owned by the state (under pubic tenure), national governments often create the situation of open access. (Lynch and Alcorn 1994).

This near open access situation has led to a mining of the resource by local and national elites, often including the government staff that are charged with the very role of control.

The consensus is, then, that while Hardin made a great contribution to the debate on common property resources, communal management is not only possible, but in many cases, a desirable alternative to state control as highlighted by these two quotes.

> "My argument is only that (a) the propensity to descend into anarchy or destruction is neither as strong nor as general as the Prisoner' Dilemma model and its variants imply, and (b) that where a situation looks promising for collective action according to the above criteria, government officials should treat this option as seriously as the other two". (Wade, 1987).

> "Hardin's model is insightful but incomplete. His conclusion of unavoidable tragedy follow from his assumptions of open access, lack of constraints on individual behaviour, conditions in which demand exceeds supply, and resource users who are incapable of changing the rules. Actual common property arrangements do not conform to all four of these assumptions" (Feeny *et al.* 1990).

1.3.5.4 Communal property rights and community management institutions

The message, as we have seen, from the study of common property resources and the regimes that manage them is that, degradation, although often occurring (e.g. Fox et al. 1996) is *not* inevitable. If resource degradation is not inevitable, the question is then, what factors improve the chances of success of collective action over the management of shared resources? Central to the answering of this question are community-based institutions and how they are organised.

> "Based on the different case studies that have been reviewed it seems that local institutions - under certain conditions - do provide such an alternative [to state management or privitisation]." (Knudsen, 1995).

Wade, 1987 describes six factors, which enhance the likelihood of success of a local organisation over the management of a communal resource.

1. *The resources*. The smaller and more clearly defined are the boundaries of the common pool resource the greater the chance of success.

2. *The technology.* The higher the costs of exclusion technology (such as fencing) the better the chances of success.

3. *The relationship between the resources and the user group.*

   i. Location. The greater the overlap between the location of the common pool resources and residence of the users the greater the chances of success.

   ii. Users' demands: the greater the demands (up to a limit) and the more vital the resources for survival the greater the chances of success.

   iii. Users' knowledge: the better the knowledge of sustainable yields the greater the chances of success.

4. *User group*

   i. Size: the smaller the number of users the better the chances of success, down to a minimum below which the tasks to be performed by such small groups cease to be meaningful (perhaps because, for reasons to do with the nature of the resources, action to mitigate common property problems must be done by a larger group, if at all).

   ii. Boundaries: the more clearly defined are the boundaries of the group the better the chances of success.

   iii. Relative power of sub-groups: the more powerful are those that benefit from retaining the commons and the weaker are those who favour sub-group enclosure or private property, the better the chances of success.

   iv. Existing arrangements for the discussion for common problems: the better developed are such arrangements for discussion of common problems the greater chances of success.

v. Extent to which users are bound by mutual obligation: the more likely that promises entered into will be kept the better chances of success.

vi. Punishments against rule-breaking: the more the users already have joint rules for purposes other than common-pool resources use, and the more bite behind those rules, the better the chances of success.

5. *Noticeability.* The ease of the detection of rule-breaking free riders: The more noticeable is cheating on agreements the better the chances of success. Noticeability is a function partly of 1, 3(i) and 4(i).

6. *Relationship between the users and the state.* The ability of the state to penetrate to rural localities, and state tolerance of locally-based authorities: the less the state can, or wishes to, undermine locally-based authorities, and the less the state can enforce private property rights effectively, the better the chances of success.

Knudsen (1995) also produces a list of attributes of robust institutions for common property resource management. There are a number of commonalties with Wade's list but in addition he identifies:

1. The user group should be well defined by itself and others by way of its locale, decent, custom etc.

2. It should have legitimate, long-standing claims to the resource.

3. Users should be in some way homogeneous, sharing similar traits or identities, or are an interest group.

4. Provide legitimate users with an equitable share of the harvest.

5. Should provide long-term security to users by reducing the risk of over-harvesting.

Knudsen (1995) goes on to make a number of statements concerning the use of local institutions, the circumstances under which they should or should not be re-built, and the importance of understanding their historical context. Wade (1987) finishes his analysis by outlining the possibility that governments could instead of hindering community based management could in fact enhance that management.

> "The government can help those local systems by providing a legal framework, and perhaps technical assistance. The legal frameworks should make it possible for local collective action organisations to obtain legally enforceable recognition of their identity and rights within the society, and to call upon the state as an enforcer of last resort." (Wade, 1997).

This approach recommended by Wade (1987), has in recent years become one of the core conservation approaches and has been called joint, collaborative or co-management (Fisher, 1995; Borrini-Feyerabend, 1996), and has been one of the main objectives of integrated conservation and development projects.

1.3.6 Outstanding questions

Integrated Conservation and Development initiatives have had mixed success (Wells and Brandon, 1992; Alpert, 1996; Larson, *et al.*,1997; Wells *et al.*, 1999). There have been outstanding questions to be answered: Can forests sustain use? What does sustainable mean? Who is the community and can they conserve wildlife? What is a buffer zone and what are the links between conservation and development? How can the "tragedy of the commons" be avoided? What are the institutional arrangements at community level that will promote responsible community management of resources?

The controlled harvesting from within protected areas is one of the most obvious ways to reduce community costs, as loss of access to in-park resources is one of the main cost communities bear. Conservationists, however, have mixed feelings about resource use as they have been fighting uncontrolled resource use for many years, and several authors state that use of forests cannot be sustained (Robinson, 1993). Resource use is seen as a double-edged sword, and an immediate question asked is; "is it sustainable?". Sustainability itself is a hotly debated term (Noss, 1991; Redclift, 1992; Levin, 1993; Ludwig *et al.*, 1993; Meyer and Helfman, 1993; Lee, 1993; Ehrlich and Daily; 1993, Holling, 1993; Costanza,

1993; Pitelka and Pitelka, 1993; Rubenstien, 1993; Willers, 1994). Over 100 definitions of sustainability have been collated. This recognises the breadth of meaning that the word has come to enjoy (Pimbert and Pretty, 1997). The results of the debate over the meaning of sustainable are not conclusive but a number of viewpoints have emerged (adapted from Levin, 1993).

- Sustainability should be defined in each context.
- Sustainability should be seen as a goal like liberty and equity.
- There is little alternative than to attempt sustainable use.
- An interdisciplinary approach is needed linking research, policy, ecological, social and economic aspects.
- Conflict, which often revolves around property rights, undermines management and so ownership and property rights need examining.
- Proposed operations should demonstrate sustainability, the onus being placed on the resource users to show this.
- Uncertainty needs to be incorporated into decision making and research.
- There is a need to involve all interested parties or stakeholders in planning.
- Extraction rates need to be well below the maximum sustainable yield.
- The way organisms persist in their environment needs to be understood.

There have also been problems with defining whom is indigenous (Alcorn, 1994), and how close to a national park should a community be to be considered local. Concern has also been raised that indigenous groups and conservationists not only define biodiversity and its conservation in different ways, but that their agendas may not wholly coincide (Redford and Stearman, 1993; Dwyer, 1994). There are also many examples in history of traditional communities destroying the resources upon which they depend (McNeely, 1994; Peres, 1994).

There has also been confusion over the buffer zone concept. Wells and Brandon (1992) describe a number of problems with the concept:

- It is not well defined, with few working examples.
- Lack of consensus on objectives, location, shape and permitted uses.
- Social benefits from buffer zones are not defined or likely to be sufficient.
- Emphasis has been on protection with community benefits coming second.
- Unknowns and uncertainties regarding sustainability of resource use.
- No legal authority to establish or manage buffer zones.

> "Current buffer zone definitions are inconsistent and overlook practical problems, and this precludes their implementation in all but very limited circumstances. The buffer zone concept, although deceptively simple and intuitively very appealing, thus faces considerable challenges."(Wells and Brandon, 1992).

The concept of buffer zones was, however, taken further during a workshop on buffer zone management in Africa (Brown and Wyckoff-Baird, 1992). This workshop was one of the first international workshops, which included representatives of park adjacent communities adding considerable depth to the discussions. The resulting definition of a buffer zone, although vague, struck a better balance between social and ecological aspects than previous definitions. This definition also clarifies one of the debating points, in recognising that buffer zones can be either inside or outside protected areas.

Some buffer zones definitions are reproduced below:

> "Areas adjacent to protected areas, on which land use is partially restricted to give an added layer of protection to the protected area itself while providing valued benefits to neighbouring rural communities."(MacKinnon *et al.*, 1986).

> "Areas outside the protected area that are designed to protect parks." (Wind and Prins, 1989).

> "Areas peripheral to a national park or equivalent reserve, where restrictions are placed on resource use or special development measures are undertaken to enhance the conservation value of the area." (Sayer, 1991).

> "Buffer zones tend to be conceived as relatively narrow strips of land on park boundaries, within which the "sustainable" use of natural resources will be permitted."(Wells and Brandon, 1992).

> "A buffer zone is an area inside or adjacent to a protected area where the harmonious relationship between the natural environment and the people is promoted." (Brown and Wyckoff-Baird, 1992).

In examining the problems associated with linking conservation and development, there has been a gap between the ideas of benefit sharing and their implementation (Wells and Brandon, 1992; Brown and Wyckoff-Baird, 1992). Integrated conservation and development projects have also found it very difficult to make the links between the activities that they do and the protected areas they are supporting and this has been a major weakness. It was to answer some of these outstanding questions that this study has attempted to contribute, by implementing and evaluating of the in-park use of plant resources.

2 CHAPTER TWO: METHODS

Three main methods were used in establishing a pilot phase of plant resource use; participatory park planning, rapid vulnerability assessment (RVA) and participatory rural appraisal (PRA) . These methods aimed at both effective participation and quality data collection. Target outputs were the careful selection of species for utilisation and the identification of appropriate community management mechanisms.

2.1 Participatory park management planning

Management Plans are considered standard and essential planning tools for protected areas (MacKinnon *et al.,* 1986; FAO, 1988). The production of management plans for both Bwindi and Mgahinga were part of project activities and my overall responsibility during the years 1992-1994. The need to produce management plans for both parks also coincided with the discussion and debate about re-opening the parks for resources use. Resource use discussions were, therefore, incorporated into the development of the management plans.

In designing the management plan process the involvement of the local communities in planning became a critical part of the design, and was in line with calls for such involvement (Blower, 1984). It was a marked departure from previous plans produced by Uganda National Parks. An external expert had at that time produced three national park management plans (Oliver, 1990, 1996, 1992b). While there was consultation with park staff during the production of these three plans, there had been no consultations with communities. Given the hostility between the park authorities and adjacent communities at Bwindi and Mgahinga, I felt that it was very important to have community participation in the production of the management plans for these parks.

Two methods were selected to involve community participation in the planning process:

i. Informal small group discussion/plenary.

ii. ZOPP and Logical Framework Analysis.

The Bwindi plan was developed first the method used for this informed the Mgahinga process. The Bwindi planning process was carried out through the medium of a series of

stakeholder planning workshops attended by selected (not elected) community representatives along with park and project staff. Sections of the plan were discussed in small group sessions and presented to the workshop as a whole. After three workshops on site and intervening editorial work by UNP and DTC staff, the planning team travelled to Kampala to present their plan to the Director of National Parks and some of the members of his Board of Trustees. It is the Board of Trustees who made the final approval of management plans. The Bwindi plan format drew from the FAO format (FAO, 1988) and that of the British nature conservation authority the Nature Conservancy Council (NCC, 1988).

At Mgahinga, in an attempt to improve and formalise participation and to enhance the quality of the planning process, a different approach was taken for the workshops, and the selection process for community representation. Through a series of meetings held at village and then at parish levels, community representatives were elected, one man and one woman, from each of the three parishes adjacent to the park. As at Bwindi the plan was produced through a number of stakeholder workshops. The main output of the workshops was a logical framework for the park. The logical framework approach is usually used for development project planning and we adapted it to a park management plan.

The logical framework approach or project planning matrix was developed in the late 1960's by the United States Agency for International Development (USAID). It is a matrix with a hierarchy of objectives and activities on one axis and indicators, means of verification and assumptions along the other (Table 2)(Sartorius, 1991; Seufert, 1991; European Union, 1993). It represents a one-page summary of a plan, using a hierarchy of objectives as the starting point of project design. The logical framework or logframe has become the standard, and often mandatory, project planning tool of most development agencies. The logical framework analysis was further developed in the 1980's by GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit) the German government technical support agency.

Objectives/Activities (summary)	**Indicators** (objectively verifiable)	**Verification** (means)	**Assumptions**
Park goal			
Plan purpose			
Plan outputs			
Management actions			

Table 2 Logical framework format for park planning.

The GTZ approach, known as ZOPP (Ziel Orientierte Projekt Planung - Objectives Orientated Project Planning), starts with a four stage preliminary analysis. The preliminary analyses are i) stakeholder analysis, ii) problem analysis, iii) objectives analysis iv) alternatives analysis (Seufert, 1991). Once these preliminary analyses are developed by the planning team, the logical framework, or planning matrix is constructed.

i) The stakeholder analysis aims to identify the key actors or stakeholders, including groups of people and institutions, involved with the park.

ii) The problem analysis examines in detail the problems facing the park and aims to develop 'cause and effect' relationships. It develops a 'web' or 'tree' of problem statements.

iii) The problem statements developed in the problem analysis are restated as objective statements, while the web relationships between the now objectives are maintained (objectives tree).

iv) The alternatives analysis selects groups of objectives that, in the opinion of the participants, are within the remit of, and achievable by, the groups and institutions implementing the plan.

Once the alternatives analysis is completed the logical framework is constructed. First by transferring the objectives selected during the alternatives analysis into the objectives column of the logframe. Once the objectives are agreed indicators and their means of

verification for those objectives are established. Finally the assumptions, upon which the success of the plan depends, are established for each level of the matrix.

ZOPP uses two key facilitation techniques, idea (meta) cards and a trained moderator. The use of cards, upon which one idea is written, means that all participants make inputs and ideas can be flexibly moved around on a board. As there are many cards placed on the board some measure of anonymity is afforded and thus controversial issues can be aired. The boards are covered by large sheets of paper, to which the idea cards are stuck once their final positions are established and their relationships identified. This allows a permanent record of the analysis, which can be referred to and later documented.

A critical element of ZOPP is a facilitator known as a 'moderator' who is trained in facilitating the process and its various detailed rules and guidelines. The moderator is independent and guides the process. This approach promotes effective participation and it manages conflict. Conflict is pinpointed and focused down from broad hostilities to specific conflict points. Methods are available to 'flag', analyse and in some cases resolve them.

The resulting logical framework therefore summarises the agreements made by the different stakeholders in a process of project design. It is also a way of presenting these agreements so that the project objectives and the causal logic between them are set out systematically. The means of checking on the achievements are identified and any important assumptions for project success, but outside project control, are identified.

2.2 Rapid vulnerability assessment

Two tools, rapid vulnerability assessment and participatory rural appraisal, were identified to answer the following questions:

- Which resources?
- How much of those resources?
- Where should they come from?

- Who should collect them?
- Who should get the benefit?
- Who should manage the activity?
- Who should be responsible if things do not go right?
- Who monitors to see if things are going right?
- How should monitoring take place?

The rapid vulnerability assessment (RVA) is a technique developed by Cunningham to rapidly assess the vulnerability of plant species to utilisation (Cunningham, 1985, 1887, 1988a&b, 1989, 1990, 1991, 1992, 1993, 1994, 1996; Cunningham and Milton, 1987; Cunningham *et al.*, 1993). It has recently been summarised in Cunningham, 2001. The rapid vulnerability assessment was used by Cunningham in the preliminary surveys of resource use at Bwindi and Mgahinga (Cunningham 1996, Cunningham *et al.*, 1993). The name rapid vulnerability assessment has been given to the method following discussions between Cunningham and myself.

The method collects ecological and social data from number of sources using a range of techniques. The fundamental unit of consideration is the species, but the technique can be used to assess the vulnerability of categories of species (i.e. medicinal plants) or of the site as a whole. The data is collected in a way that allows increasing refinements of the data set. At each level decisions can be made as to which aspects to emphasise to meet management priorities. The level of knowledge of any one species is developed only to the point necessary to make such a management decision. This allows a large number of species initially identified, to be quickly reduced to a smaller number of key species, which need more detailed evaluation.

A key aspect is the integration of indigenous knowledge with scientific knowledge. Both these types of knowledge have their strengths and weaknesses. Attention is needed to identify mismatches between indigenous and scientific data sets, and so to reduce errors. For species information the matching of the vernacular name with the scientific name is critical and links the two bodies of information into a powerful tool (Martin, 1994).

2.2.1 Background principles

The rapid vulnerability assessment is based on a number of principles drawn from ecology but also sociology and economics. These are:

- There is a relationship between species population size and quantities of material available for harvest. Comparing two similar sized organisms of different population size, the more numerous species will have more of its total biomass available for harvesting. The species with a smaller population will have a smaller quantity of its total biomass available for harvesting.
- This relationship is modified by species ecology, life history, and which parts are harvested and used.
- The growth and reproductive capacity of a plant (or animal, although my study focuses on plants) can respond positively as well as negatively to harvesting. One factor affecting the ability to harvest depends on whether a species exhibits density dependant compensation, and as the density of the species falls the species populations compensates by increasing its rate of increase or growth (Robinson, 1993).
- All species have a range of quantities of material harvested where harvesting will be ecologically sustainable. This will range from almost zero to some upper quantity (variously called maximum sustainable use, maximum sustainable yield or maximum sustainable cut (Robinson, 1993)). Hall and Bawa, (1993) define ecological sustainability where the harvest has no long term deleterious effect on the reproduction and regeneration of populations being harvested in comparison with equivalent non harvested natural populations. Furthermore, sustainable harvest should have no discernible effect on other species in the community, or on ecosystem structure and function. These effects may be determined by comparing harvested with unharvested systems. This range of quantities that can be harvested from a species can be considered as a margin of vulnerability, sustainability, or error. A species with a narrow range in the quantity of materials that can be harvested without impacting on its survival, will have be highly vulnerable to over-harvesting and will have a narrow margin of error.

- For any one species the range of quantities that can be harvested without a long-term impact on the species will vary with location, season and parts used.
- As demand increases then there are social and economic changes from subsistence use to commercial exploitation (Cunningham, 1988b) Among these changes are the growth in human populations, the development of urban centres from which stems increased demand, for example, for traditional medicines. This stimulates commercial collection and sale of these products. Commercial collectors then operate in the rural areas, either collecting themselves or hiring locals to collect. Any local traditional sanctions against use or collection practices are usually unable to withstand the pressure and over-exploitation occurs (Cunningham 1988b).

2.2.2 Vulnerability factors

From his work with medicinal plants in South Africa, Cunningham (1991) identified four criteria for the identification of vulnerable plants to overexploitation. These are; life form, parts used, distribution and demand. He also discusses the response of the plant to harvesting as being another important attribute and I have listed this as a fifth criterion. Within these five criteria other factors can indicate the level of vulnerability to harvesting.

2.2.2.1 Life form

In the 1930's Raunkiaer developed a system for the classification of plant life forms, in which a particular character represents something fundamental in the plant's relationship to climate (Chapman, 1976; Rutherford and Westfall, 1986). His system classified life forms based on the height of the perennating buds (the buds from which plant re-grows following the unfavourable season) of the plant relative to the ground surface. His five main classes are as follows (from Rutherford and Westfall, 1986):

Phanerophytes, which have their bud bearing shoots elevated and exposed and are largely trees, shrubs and lianes.

Chamaephytes, which have their perennating buds closer to the soil, surface but definitely above the soil surface.

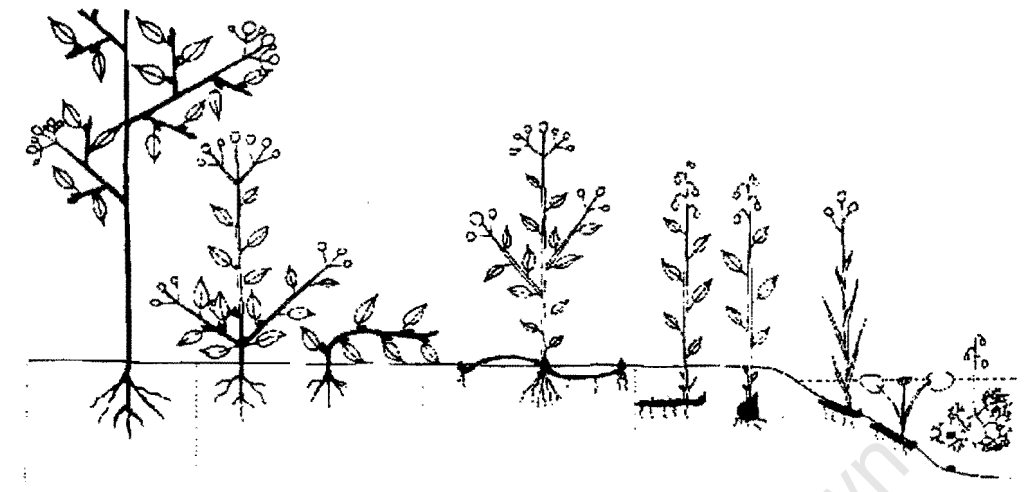
Hemicryptophytes, which have their buds at the surface of the ground.

Cryptophytes, which have their buds beneath the soils surface and include the important geophyte group.

Therophytes, which are annual plants (ephemerals) that survive the unfavourable season as seeds.

- Rutherford and Westfall (1986) have described generalised relationships between plant life form sequence, according to the height of the renewal buds and plant ecological properties. These characteristics include average plant age, mean youth period, growth rate, mean age of above ground material, proportion of reproductive production, ratio of production to biomass, and minimum resource requirements. Cunningham (1993) has then used life form to analyse these generalised relationships to indicate the vulnerability of a particular life form to over-harvesting. In regard to resource use, life forms indicate a general progression of reduced vulnerability to harvesting, from trees the most vulnerable, to ephemerals the least vulnerable.

> "Life form categories represent a useful classification for establishing resource management principles, bridging the gap in knowledge about plant demography and enabling the first approximation of categories of vulnerability to commercial exploitation." (Cunningham, 1991).



Parts of the plant which die in the unfavourable season are unshaded, persistent axes with surviving buds are black

Figure 3 Diagrammatic representation of Raunkier's life–forms

2.2.2.2 Parts used

The part of the plant that is used significantly affects sustainability of that use. The harvesting of seeds, fruit, leaves, stems, roots, bark, bulbs or the whole plant will have different impacts on the plant itself. The effect of the use of the reproductive parts, flowers, fruit and seeds is likely to depend on factors including, the generative capacity of the species, viability of the seed and levels of seed parasitism. In many species, however, seed collection is likely to have an impact only if taken to excess, and the quantities harvested compromise future recruitment into the population. There are, however, examples of the felling of whole trees to harvest high value fruit (Pendleton, 1992). This seemingly occurs where tenure is insecure. Harvesting of leaves, in many cases, has a low impact on the individual plant. Studies have shown, for example, that low levels of defoliation do not significantly affect the growth of the species studied (Maron, 1998; Kaitaniemi *et al.*1999). The removal of woody biomass from phanerophytes (twigs,

branches, bark, stems and the whole plant, roots) will have a varying impact on the plant. Of greatest concern are removal of the bark, stem (trunk), roots and the whole plant (Cunningham, 1989, 1991, 2001; Cunningham and Mbenkum, 1993). Many phanerophytes resprout following cutting and this has an impact on sustainability (see factor 5, response to harvesting, 2.2.2.5).

2.2.2.3 Abundance/distribution

Abundance consists of the distribution, that is geographical coverage or range (number and size of inhabited areas), and intensity, that is the density of within those areas (Begon, *et al.*1990). Abundance of a species is critical to its vulnerability to harvesting. Abundant, widely distributed species will be less vulnerable to overuse. Low abundance (rare) species with limited distributions will be much more vulnerable to overuse. In a classification of the types of rarity, Begon, *et al.*(1990) add habitat specificity to geographical range and the size of local populations as the factors to consider. Those species with very narrow habitat requirements (habitat specificity) are likely to be rarer.

2.2.2.4 Demand

The level of demand for the products of a plant will have a major impact on the plant. Demand is created by the social factors of the human population that is using the species. These include the human population size, the value of the product to that population, the type of community creating the demand i.e. rural/urban, local/distant, well established/new and cohesive/disparate. A number of social factors can also mitigate demand, these include security of tenure and length of association with the plant resources. Collecting data on these, demand promoting and mitigating, social factors is a part of the assessment.

Demand is made up of two elements the quantity harvested and the frequency of harvest (Bennett, 1992). Figure 4 shows the effect of harvesting on individuals, populations or species showing interaction of quantity harvested and frequency harvested. The quantity harvested and frequency of harvesting, are themselves affected by a number of factors.

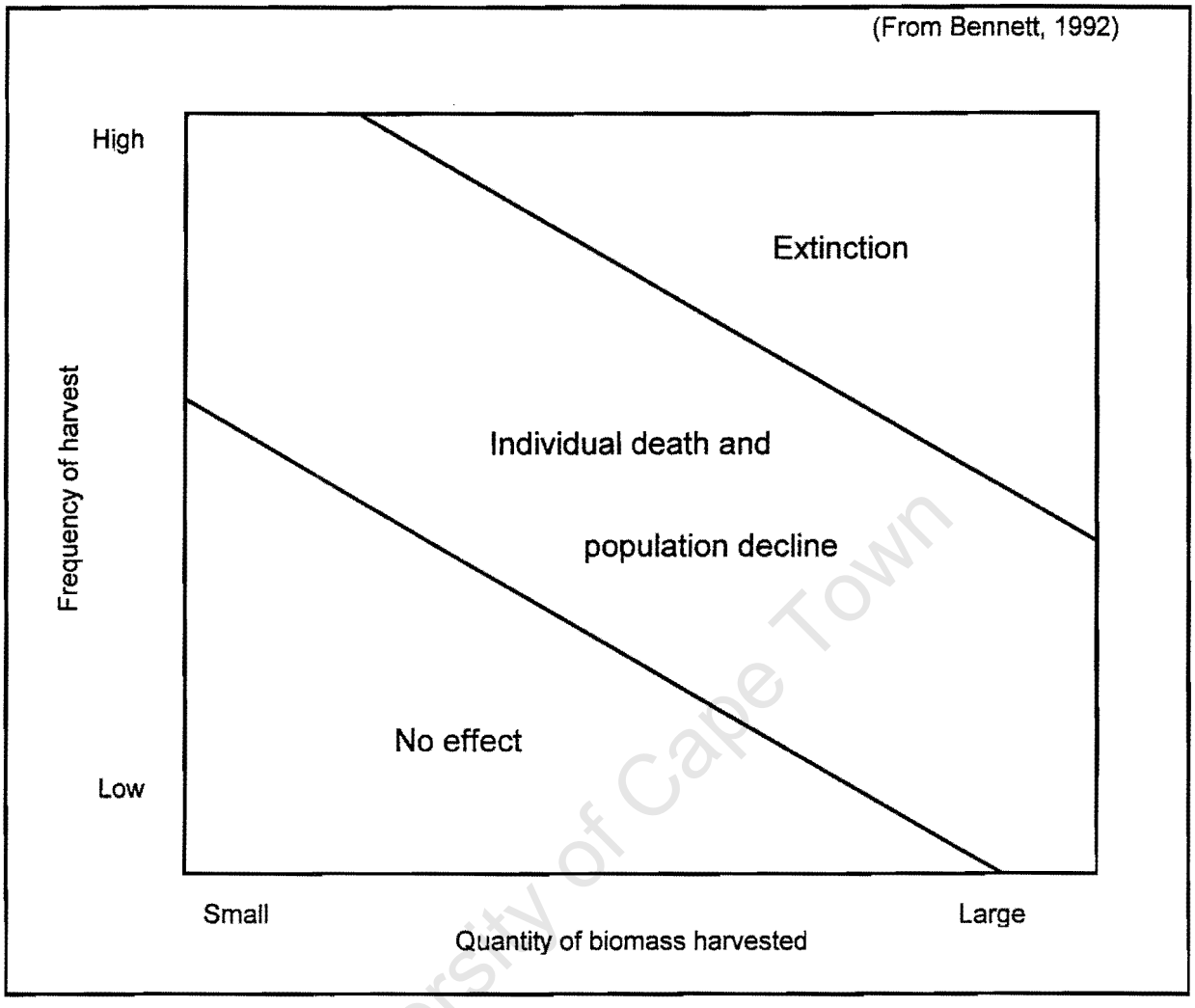


Figure 4 Demand on plant harvesting

These factors include; seasonal harvesting, the level of commercialisation, traditional harvesting practices, and the presence of substitutes. Demand may be reduced if harvesting is restricted to seasons. Once a product moves from subsistence use to commercial use the chances of unsustainable use increases. Commercial harvesting is a facet of demand and indicates a demand strong enough that harvesters can earn cash income from the harvesting activity. Resource depletion is one of the responses to strong and sustained demand for non-timber forest products, other responses are domestication and synthetic substitution (Bonati, 1991; Pendelton, 1992).

2.2.2.5 Pattern of selection and use

If a certain size, age or quantity of a plant is used, the remaining population may ensure the survival of the species. Ecological assessments, however, may indicate a higher availability than more selective resource user assessments and lead to an overestimate of supply.

Many cultures developed practices that limit the use of important and restricted species, based on tradition and often religion (de Klemm, 1991, Cunningham, 1993). These traditional practices are often inadvertent, being the by-product of practices with other purposes. Some times the practices appear a deliberate attempt at reducing demand or damaging practices (Cunningham, 1988b). When demand increases, especially if the resource becomes commercially exploited, these traditional practices often break down. For example Cunningham (1993) observed in Natal, South Africa, that restrictions placed the harvesting of medicinal plants by traditional leadership and traditional community policemen, reduced commercial exploitation. Cultural change, increased entry into the cash economy and unemployment has led to these controls breaking down. The availability of substitutes affects species vulnerability indirectly by reducing demand.

2.2.2.6 Response to harvesting

The ability of a species to regrow or increase its growth or reproductive rate as a response to harvesting, affects its vulnerability to harvesting. Many trees for example sprout when cut, especially if the main stem is cut at an early age. Rotational cutting of tree stems, known as coppicing, is the basis of the traditional and long practised management technique for British woodlands know as coppice with standards (Rackham, 1990). Several tropical trees, but not all, resprout and can be coppiced. Species with various life forms vary in their ability to regrow and this needs to be taken into account.

The complex interaction of these five "vulnerability factors" will determine whether a species is vulnerable to harvesting, and where it falls on a gradient from sustainable to unsustainable use. The focus of this approach, therefore, is not to identify the maximum sustainable yield for each species but to identify whether harvesting is or will be carried out in a manner that is consistent with its vulnerability. The system links ecological and social

data (Table 3), which is rarely a feature of these data sets (Wily, 1994). It identifies vulnerable species or species categories, which require further research, greater caution or substitution, and it identifies gaps in the information. Of greatest concern to protected area and resource managers, are limited distribution plants in the slow-growing, vulnerable life form categories, where the parts used are those that impact most on the plant's recruitment and persistence, where demand is high and few substitutes are available (Cunningham, 1991).

Data Sets	Data Collected
Social Data	Demographic patterns Community characteristics Tenure Community institutions Cultural practices
Utilisation data	Resource categories Resource category importance/value Numbers of resource harvesters Voucher specimen and vernacular name Harvest rates Parts used Demand Market factors
Biological data	Species abundance Species locations Relative growth rates Life form

Table 3 Data types that link social and ecological data

2.2.3 Use categories and site features

The method can identify vulnerable categories of resource use. Timber, from trees (a vulnerable life form), is difficult and expensive to manage sustainably (Muir, 1990), whereas many medicines are leaves from less vulnerable life forms. It is also possible to estimate the potential of a site for resource use by looking at overall features. These include community as well as ecological factors. For example, habitat, species and life form diversity, are interrelated factors that indicate the vulnerability of an ecosystem. Less vulnerable habitats such as grasslands have a lower species diversity and higher biomass production. More diverse habitats with vulnerable plant life forms such as forests are more vulnerable to use. Where species diversity is high, each species will be less abundant,

produce less biomass and have less potential for large harvests. Human population density is a driving force to demand, and areas where human populations are high will be more vulnerable to resource use.

2.2.4 Data collection, assessment and decision making

Data was collected from literature, herbaria, local experts, team observations, research plots and market surveys. Most of the information came from local experts supplemented by team observations. Detailed species information is scanty in the literature. I also developed a recording system to guide species assessments, and produced field and summary forms (Appendix 3). Once the species summary form was sufficiently complete it was reviewed and the decision taken whether to allow use. To assist the team to make this decision, I developed a flow diagram where species were assigned to categories depending on the results of the assessments (Figure 14).

Species abundance in the potential multiple-use area was estimated using the DAFOR Scale (Dominant, Abundant, Frequent, Occasional and Rare). This abundance scale is a rapid method for subjective assessment of the abundance of a species at a particular site. It is widely used in the UK by government and non-government conservation agencies for preliminary rapid site assessment prior to quantitative plot based methods (Smith *et al.*, 1985). The great advantage of this method is that it is rapid. The disadvantages of the method are that it is subjective and therefore depends on the experience of the user, and affected by pattern of distribution. Hence, a highly clumped species that is rare within the context of the site as a whole may be overestimated as it appears abundant in the few locations that it occurs (or is visited) or underestimated if the survey does not encounter it. In using the scale with local resource users the first step was to discuss the objectives of the assessment and agree on vernacular words corresponding to frequent, occasional, and rare (the commonest categories) and then agree as to what that definition might mean for a plant in the forest. Prior to going into the forest the list of species requested by the resource users was read out and the group discussed each one before assigning an abundance rating for that area of forest. In the ensuing forest walk that aimed to locate the vulnerable species (as well as potential use area boundaries etc.) further discussion on abundance were held. Specimens of species for which a botanical name was not known were also collected.

Once collected data, was entered into a number of forms that I developed and used as a basis to discuss whether a plant should be allowed for use.

2.2.5 Species and product case studies

For two species identified as vulnerable from the first round of PRA, and from earlier studies, I carried out case studies. I also carried out a case study on an important product using a number of vulnerable species. The case studies used both social and ecological methods to collect more information. The case studies were intended to be practical studies that built up information about the species to be harvested. They were carried out on a relatively few days and often in an opportunistic manner. The purposes were to:

- To verify information collected through the earlier part of the rapid vulnerability assessment.
- To confirm decisions made on the utilisation of the species.
- To add basic biological data on the species.
- To collect figures on supply and demand.
- To initiate harvested species monitoring.
- To test out methodology .

They were not meant to be comprehensive ecological studies, and did not meet basic ecological criteria for vegetation analysis, but aimed to provide valuable information for such studies if they were considered necessary. Some of the species in-fact later became the subject of single species MSc. studies (Kamatenesi-Mugisha, 1997; Muhwezi, 1997). The product case study was carried out on tea plucking baskets, while the species case studies were carried out on the lianas *Loeseneriella apocynoides* (Omujega) and *Smilax anceps* (Enshuri). For these two species, harvesting and monitoring sample plots were established to verify the information gathered and aid decision making regarding resource

use. An informal growth trial was also carried out on *Smilax anceps* (Enshuri). The plots represented the next step from data collected from forest users towards formal and detailed ecological work.

The harvesting plots and growth trials did not meet normal ecological criteria for the following reasons.

- Numbers of replicates were small, far below acceptable numbers.
- Plot sizes were small.
- There were no control plots.
- Statistical analysis consisted of descriptive statistics with no calculations of standard errors due to small sample size.

Experienced resource users were used as part of the research teams for the case studies. They were used for site selection, guides to the sites, measuring the plots and enumerating the stands. In the case of *Smilax anceps* (Enshuri) the users harvested the plots so that production rates could be assessed. Trial harvesting was not carried out in the *Loeseneriella apocynoides* (Omujega) plots due to the rarity of the species. Past harvesting was evidenced and recorded by the cut stems of the liane.

Site selection: Site selection was based on the information collected during the parish workshops, as well as using the specific knowledge of resource users, team members and rangers.

Plot sizes plot sizes varied between 10x10m for *Smilax anceps* (Enshuri) and 20x20 for *Loeseneriella apocynoides* (Omujega). Data was collected on the trees and each of the plots was mapped. Basic site data, such as slope aspect surrounding vegetation were also recorded.

2.2.5.1 Methods Loeseneriella apocynoides case study

Demand

Farmers were, either visited at their homes or at tea collection centres and asked general questions about their products and the materials they used, or interviewed in groups as part of the parish workshops. Items were measured and weighed. Other information was gathered from the secretary of the parish tea farmers association, Kayonza Tea factory, interviews with users from other parishes and the reports from Scott 1992 and Cunningham 1992. The dimensions of weft material were measured. Twenty measurements from each granary, and the largest weft from each tea basket were measured. Direct measurements were not made on stretchers and pot baskets and calculations were made based on the other products.

Supply

A short, three-day forest survey was carried out. This was considered a preliminary survey to identify if larger more rigorous survey was justified (subsequently this was carried out as an MSc from Makerere University (Muhwezi, 1997). Due to the remoteness of the sites identified by the community, a camp was established inside the forest. A team from the National Park and project staff but including a local basket maker (but not one that had supplied the original information, collected in the villages) carried out the recording. Five sites were visited and two temporary and four permanent plots established. Permanent plots were square 20m x 20m while the temporary plots, located in areas of lower abundance and were of radius 10 & 15m. Data collected was as follows:

site name

aspect

slope steepness - flat, gentle, steep

slope position - ridge top, valley side, valley bottom

canopy - % by visual estimate

altitude

tree species - identified by scientific or local name and specimens taken if necessary.

tree diameter - dbh

Loeseneriella apocynoides:

numbers of plants and stems

diameter of all stems >10mm dbh

diameter of most stems < 10mm dbh. (In two plots where the small size stems were numerous they were measured in one or two sub-plots of 10mx10m)

Diameter of cut stems

Quality assessment of all stems of harvestable size into categories judged by the basket maker i.e. poor, fair, good and very good.

2.2.5.2 Methods Smilax anceps case study

Demand

Demand was calculated from human population statistics and assumptions were used based on known patterns of product use by households collected from key informant interviews and previous studies (Scott 1992, Cunningham, 1996).

Supply

Supply was estimated by surveying areas of the forest with a team, which included expert *S. anceps* users. In the study site *S. anceps* was restricted to small patches dotted throughout the forest. The sizes of the patches were measured. Trial harvesting within these patches was carried out. Each plot was 10x10m ($100m^2$). A total of twelve harvesting plots were recorded. Each plot was recorded for: Canopy cover, altitude, tree species and ground cover. Processing of the material into products was observed and the products weighed.

Evaluation for on farm production

To assess the potential for *S. anceps* for on farm production, propagation and growth observations were carried out. The growth of transplanted rootstocks was subsequently

measured. Stocks were planted in a number of niches in the agricultural landscape. Four methods of propagation were tried.

1. Transplanting of rootstocks.

2. Seeds.

3. Cuttings.

4. Stolon propagation.

2.2.5.3 Methods tea plucking basket

Tea Plucking Baskets (entete) are an essential commodity for the Ugandan Tea Industry. In the early 1990's the supply of tea baskets was not able to keep pace with the remarkable growth of the tea industry in Kayonza Sub-county, Rukungiri District, at that time. The vast majority of baskets came from vines within the Bwindi Impenetrable National Park. Growers suffered from shortages in baskets and this is reduced the quality of the tea. Basket makers were stealing materials from the National Park and this brought them into conflict with park staff.

The data for the tea plucking baskets consisted of key informant interviews with tea farmers at a tea collection centre, with management of the Kayonza Tea Factory, and park staff. Baskets at the collection centre in Mpungu Parish, were weighed and measure, and a market survey was carried out in Butogota Market, the main market in the tea growing area. Data was collected opportunistically over during 1993 and early 1994, while on various project field visits.

2.2.6 Vulnerability scoring

Once the data was collected and being analysed I devised a simple scoring method to assign a numeric value to a species and therefore more easily see where a species fell on the gradient of sustainability. Each vulnerability factor was ranked on a scale of 0 to 5, where 0 represented the least vulnerable element for each factor. Fast growth, abundant occurrence, low habitat specificity and low demand would score low values (0-2), and slow

growth, vulnerable life forms and parts used, high habitat specificity and high demand would have high scores (3-5). As 12 features were considered the maximum potential score was 60 representing extreme vulnerability, and the minimum potential score was 0, representing very low vulnerability. The scores were assigned on based on experience of the species gained from the information gathered during the rapid vulnerability assessments. This compares with a similar scoring system devised by Peters (1994).

2.3 Participatory rural appraisal

Participatory Rural Appraisal (PRA), is an approach to community development that has evolved over the last 10 years and spread rapidly within rural development (Chambers, 1992; 1994, 1997). PRA was a further evolution of Rapid Rural Appraisal (RRA) (Chambers, 1992), which itself was a response to perceived weaknesses and dissatisfactions with then current approaches to development methodologies, particularly the problems of a) 'rural development tourism' characterised by brief visits to rural areas by urban professionals, b) problems associated with formal questionnaire surveys for collecting data, which were seen as unwieldy, time consuming and costly, and c) with an increasing recognition of the valuable information held by local communities. Rapid Rural Appraisal evolved into Participatory Rural Appraisal with the introduction of increased participation into the process of data collection (Chambers, 1992; 1994, 1997). PRA has been used extensively in community forestry (e.g. Carter, 1996; Hobley, 1996; McGean *et al.,* 1996) adapted for use with biodiversity conservation (for example Momberg *et al.*, 1994; Drijver, 1994). Participatory rural appraisal has developed a number of principles and a whole range of methods and there have been a range of guidebooks and publications and latterly more detailed manuals that deal with PRA in general (e.g. Davis-Case, D. 1990, Pretty *et al.,* 1995) and now ICDP's more specifically (Margoluis and Salafsky, 1989; Worah *et al.* 1999).

Participatory Rural Appraisal (PRA) has subsequently evolved beyond research into project or activity implementation and other labels have been developed to reflect this including participatory learning and action (PLA), participatory assessment, monitoring and evaluation (PAME) (see also Cunningham, 2001). Much of the work described here

includes action, implementation and monitoring, but the term that is familiar to most people, PRA is used here to cover the different approaches used in this work.

The principles of PRA (Chambers, 1992) include;

a) Reversing learning where development workers learn much from rural people.

b) Rapid and progressive learning, where learning is quick and flexible.

c) A relaxed approach, not hurried and involving listening.

e) To be aware of biases, for example gender and ethnic and seek opinions of marginal groups.

f) Applying "optimal ignorance", gauging when sufficient, and sufficiently accurate information has been gathered.

g) Verifying information, cross-checking using several sources.

h) Handing over the facilitation, and the process to the community whenever possible.

i) Facilitators continuously examine their behaviour, and try to improve.

j) Information should be shared with, left, or returned to the community.

Methods were selected from general development literature (Davis-Case, 1990; Chambers, 1992), training sessions attended by project staff, and literature from Indian joint forest management (JFM) (Poffenberger *et al.*, 1992). Available information on the area was collected. 1:25,000 scale base maps were prepared prior to fieldwork.

A team was formed to take a lead in establishing extractive resource use. These included the Warden Multiple-use for Bwindi Impenetrable National Park, the Multiple-use Officer, Botanist and Deputy Project Manager from the Development Through Conservation Project (DTC) and Monitoring Researcher from the Institute of Tropical Forest

Conservation. Other staff were involved including DTC's parataxonomist (Forest and Herbarium Technician), patrol rangers and the project's conservation extension agents.

The multiple-use team went to each parish and camped for a period of 2-5 days on 3-4 occasions and we named them 'Parish Workshops". Other visits were made for forest surveys and establishing monitoring plots. During the parish workshops a number of PRA exercises were used. These are listed here and are described with the results in the next chapter and the sequence of activities laid out in Figure 10.

- Introduction exercises; self-introductions and resource use introductions with a flannel (towel) board (Linney, 1995).
- Timelines; community events and forest history.
- Resource availability and population trends analysis; stick graphs.
- Resource ranking by gender; pair wise and list ranking.
- Ground maps.
- Resource allocation (flannel board).
- Key informant interviews (herbalists, basket makers, beekeepers, community leaders and others.
- Ground relationship graph. This method was developed by me and is described in detail in section 3.4.5.
- Forest Surveys/walks; user species abundance ranking, boundary identification, vulnerable species assessment.

In addition we organised more recreational activities including slide and film shows and local dances as part of the time that we stayed in the villages. To assess the level of participation, attendance records according to gender and minorities were kept, and participants' comments were recorded. The participatory rural appraisal provided much of the field data for the rapid vulnerability assessment (RVA).

2.4 Collaborative management

As we began the process of working with communities, we received draft literature through the International Institute of Environment and Development RRA Notes of some of the Indian Joint Forest Management work. We began then to call the approach we were using "joint management". The idea behind this new concept was the collaboration between communities and Uganda National Parks over the management of the forest or parts of the forest. This approach of government and local communities managing natural resources in a joint or collaborative way, has now gained considerable support and has become one of the core approaches for IUCN in the region and elsewhere (Fisher, 1995; Borrini-Feyerabend, 1996; Berkes, 1998). As the elements of joint, collaborative or co-management (I use these terms interchangeably), were evolving during this study the details will be discussed in the discussion chapter.

3 CHAPTER THREE: RESULTS

3.1 Participatory management planning

> "A more sustainable conservation, with all its uncertainties and complexities, cannot be envisaged without all the actors being involved **in continuous processes** of learning." (Pimbert and Pretty, 1997) (my emphasis)...
>
> "Mpora mpora ekahitsya omunyongorowa aha iziba - Slowly slowly the worm reaches the well." (Rukiga saying).

As a result of the participatory planning processes (Photo 1), draft management plans for each park were produced. These processes exposed some of the costs the community bore from conservation, and documented the reasons for their hostility towards conservation measures. As part of the park plans, objectives for resource use, and zonation plans incorporating utilisation, were produced.

3.1.1 Revealing the community reality - the costs of conservation

> "Iyo utarikumvikana numuturani, ntaho umutabara - When your neighbour is your enemy you let his house burn." (a Bafumbira saying).

During the management planning workshops the negative impact of the parks on the communities was revealed. Also revealed were the feelings of the communities towards the park and their relationship with park staff and authorities. Community situation analyses are not common in the conservation literature, and I include our participatory analysis in some detail. Much of the analysis was derived from the problem analysis stage in the planning workshops, supplemented by information collected during field visits, surveys and other meetings. The description focuses on Mgahinga where the level of hostilities was higher at the time of the management planning process, but the Mgahinga situation mirrored that of Bwindi, and Bwindi examples are also included.

The question "are gorillas more important than people?" has often been asked by local community members around both forests, and was asked during the planning workshops.

The bitterness towards conservation activities and the gorillas themselves was expressed strongly. The gorillas were seen as the ultimate cause of those community hostile conservation activities. The "problem tree" part of the preliminary analyses, examined the cause and effects of a particular core problem. A process of discussion initiated by the idea cards consensually identified the core problem. The different levels of causes and effects of the core problem were then developed by the workshop participants. Two problem trees were developed for Mgahinga, the first (Appendix 1), was the general problem tree for the park. It had as its core problem "Environmental degradation and loss of wildlife in Mgahinga and adjacent areas". The second problem tree was developed from it and took as its core problem "Bitterness of local communities toward Mgahinga Gorilla National Park". This problem had appeared in the general tree in a number of places and was worded as hostility and negative attitudes of the community. This second problem tree (Figure 5) was supplemented with information gathered during an earlier survey (Cunningham *et al.*, 1993). Both problem trees form an appendix to the draft management plan for Mgahinga Gorilla National Park (UNP, 1994b). In Figure 5 the problem tree is produced in detail in the main body of the figure and summarised underneath it. The summary outlines the chain of cause and effect which starts with increased protection and law enforcement and process through loss of community access to resources and economic opportunities, which in itself leads to increased poverty, and hence bitterness towards the protected area authority. This bitterness led to increased conflict and ultimately to the potential of reduced biodiversity conservation. There were four root causes of the bitterness; eviction from the park, closing the park to resource use, park management perceived as aggressive and poor wildlife control by park staff. These four root causes are described below.

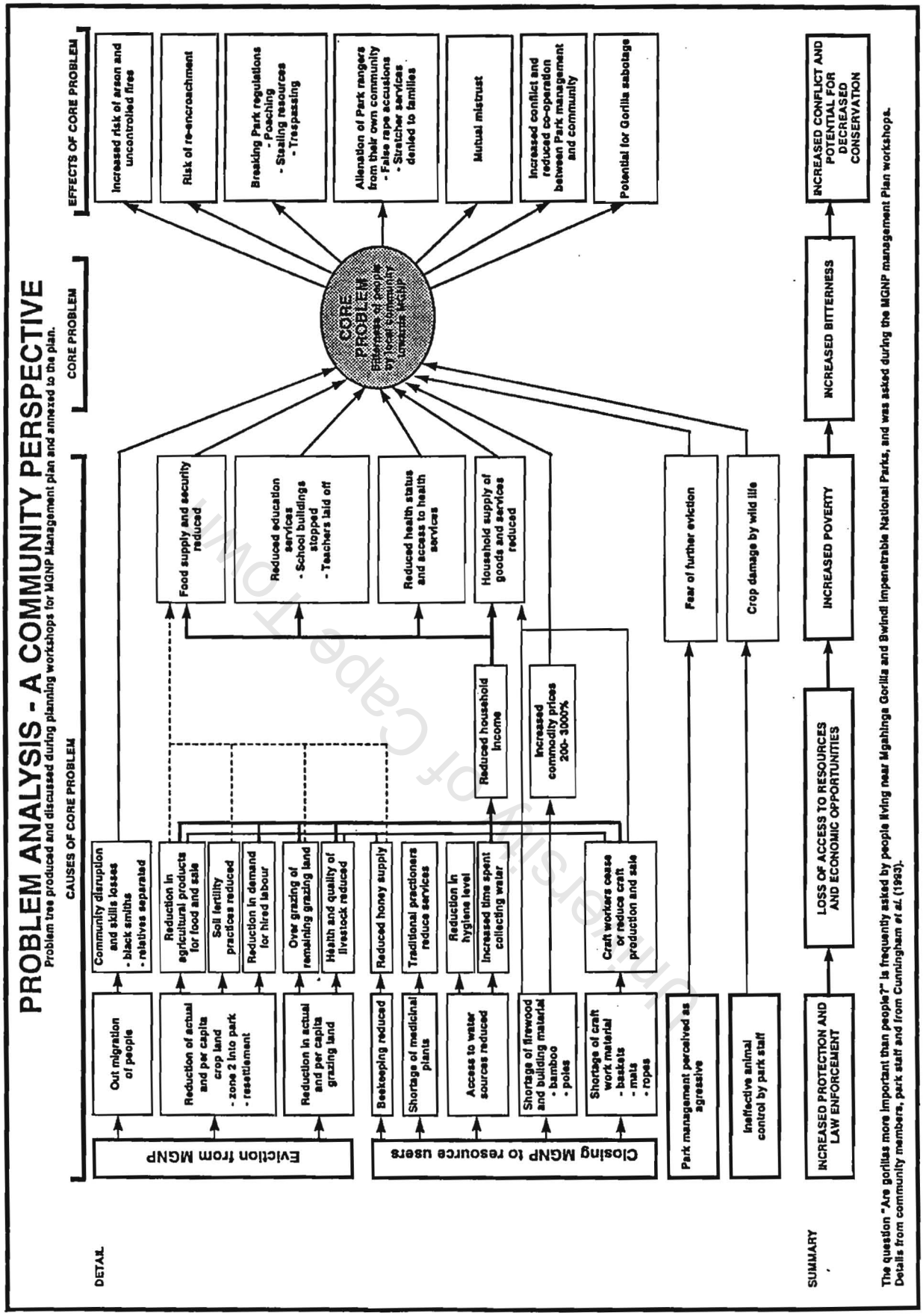


Figure 5 A problem analysis at Mgahinga – a community perspective

3.1.1.1 Eviction from the park

To understand the eviction process some background is necessary. The Gorilla Game Sanctuary (later upgraded to the Gorilla Game Reserve) was established in 1930 and managed by the Game Department. The Mgahinga Forest Reserve was established in 1941 and managed by the Forest Department. The two areas followed the same boundary until 1951, when the Forest Department degazetted 10 km^2 to provide local people with additional agricultural land. Local people moved in and cultivated. The Game Reserve was not, however, degazetted and was in fact extended in 1964 to an area that had never been a protected area, and had been under cultivation for a long time. The Game Department did not demarcate this new extended boundary, evict the people living there or enforce the Game Act outside the reduced Forest Reserve boundary. Under the law, however, the people living in both the degazetted forest reserve area and the area only gazetted in 1964 were illegal encroachers (Kingston, 1967; Yeoman *et al.*, 1990; Kalina, 1993). During a public enquiry into the establishment of the park (Yeoman *et al.*, 1990), the issue of encroachment was discussed with local communities. It was later recommended that the park boundary should be established at the pre-1951 boundary and this was implemented in May 1991. The implication of this was that those people who had been living for 30 years in the 10 km^2 degazetted by the Forest Department, would be evicted. Subsequently, after some difficulties, the Ministry of Tourism, Wildlife and Antiquities and Uganda National Parks signed an agreement with local community leaders and the district administration for a planned relocation of residents and the cessation of cultivation and grazing. In return compensation payments were to be given to the displaced people, as well as increased agricultural support and infrastructure development in the surrounding areas (Bachou *et al.*, 1992). Two hundred and twenty households moved out, and a further 2000 landowners ceased cultivation by the end of 1992. With support from USAID, compensation was paid in May 1993. Increased agricultural support was given by the CARE/Development Through Conservation project through Uganda National Parks Extension Rangers. Unlike other and subsequent evictions of "encroachers" in Uganda (Colchester, 1997), people moved out of the park in a peaceful and negotiated way. There were, however, other effects. Some of the families left the area completely, which led to the separation of relatives and skills losses. Of the three blacksmiths in Gisozi Parish only

one remained within the parish. Other families settled on land outside the park increasing the land shortage there. The land inside the park was previously significant agricultural land, growing mainly wheat and Irish potatoes, sold to either to Rwanda or to Kampala. The community made significant losses in terms of income from sale of crops, land for food production, and employment as hired labourers (many people cultivated for absentee owners). The cost of hiring land outside the park was increased by 1000% (Table 4). Grazing land was greatly reduced as people moved out and the health and numbers of livestock fell. The prices of milk increased while the value of cattle fell. Wheat straw used for thatching became in short supply and the price increased (Table 4).

Product	1990 Price Shillings	1993 Price Shillings	% increase
Bamboo (stem)	10	300	3000
Seed potatoes (sack)	1000	15 000	1500
Land hiring (0.25 acres/season)	2000	20 000	1000
Wheat thatch (isa - a 2 hand diameter bundle)	10	50	500
Milk (litre)	100	500	500
Potatoes (sack)	2000	8000	400
Cyperus mats	1000	3500	350
Thatch grass bundle	500	1500	500
Honey (1.5 kg)	1000	3000	100
Building poles (wattle, each pole)	300	700	233
Wheat (cup)	100 – 150	200 - 300	200
Bamboo baskets	300 – 400	600	200
Goat (15 kg)	5000 - 8000	8000 - 15000	187
Cattle (each animal)	50 000	15 000	% decrease 300

Information collected from Park Rangers, MGNP. These prices have not been corrected for inflation, as the inflation rate for 1990/91 was not available. The rate for 1991/2 financial year was 63% and for 1992/3 was 7.7%. Nonetheless, the price increases are far in excess of the probable inflation rate and although these data should be treated with caution, the price changes indicate a relative increase in scarcity of key wild plant products (from Cunningham *et al.* 1993).

Table 4 Commodity price changes as a result of eviction from Mgahinga Gorilla NP, 1990-1993.

3.1.1.2 Closing Mgahinga Gorilla National Park to resource use

Bamboo was the most significant product collected from the forest (Kingston, 1967; Cunningham *et al.*, 1993), and became in very short supply. The price went from 10/-(US 1c) per stem in 1990 to 300/- (US 30c) per stem in 1993, a massive increase of 3000% (Cunningham *et al.*, 1993). Other resources that became in short supply increased in price (Table 4). Access to water resources was initially stopped, but the pressure during the dry season was too great and restricted access was allowed to some of the small springs. This however still meant all-night queues at the main source of water, which only trickled out of the park. The shortage of medicinal plants led to a shortage of services by the herbalists. In some villages half the households had previously been engaged in basket making and now production was severely reduced (Cunningham *et al.*, 1993).The net effect of the relocation and park closure was to reduce income, increase prices, reduce the supply of household goods and reduce food security. Community projects were halted. The Gisozi parishioners were building a new school when the park closure occurred, and could no longer make their contributions. Building stopped, teachers were laid off, and education reduced (Hanyirwa and Nteziyaremye pers.com.). All these aspects increased poverty.

3.1.1.3 Park management perceived as aggressive

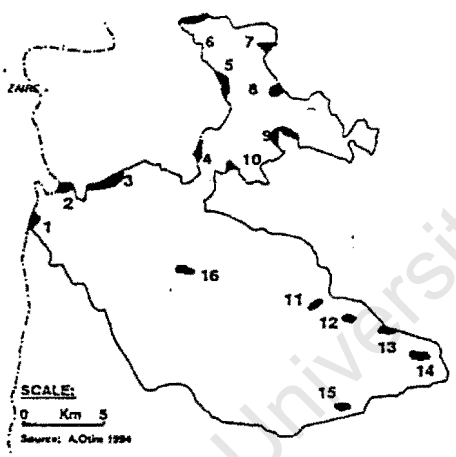
Strict law enforcement led the community to perceive the park management as aggressive. Persistent use of the word "zone" for areas outside the park led to fear of further park expansion, and the delay in compensation added to peoples dissatisfaction with park management (although this was outside management control). At this time it was judged as not being possible to carry out a socio-economic baseline survey for the Development Through Conservation project until the promised compensation payments had been made and emotions had cooled. Misunderstandings over the access to water and the confiscation of jerry cans from those collecting water added to the hostility.

3.1.1.4 Poor control of wildlife

The damage of crops by buffaloes added insult to injury. "We are arrested for going into the park, yet why can't we arrest the buffaloes when they come on our land?". The park was considered to be making little effort to help the communities with this issue.

3.1.1.5 Community retaliation against the Parks

A similar pattern of problems and costs associated with conservation successes occurred at Bwindi as at Mgahinga. These problems led to considerable hostility and to actual and potential threats to both parks. For example at Bwindi, sixteen fires started during a drought following the gazetting of the national park, and almost half these fires were started deliberately or allowed to enter the park from outside. For many of the fires community assistance was not forthcoming, and there are stories of communities helping to fight the fires and then deliberately restarting them. Five percent of the forest burnt, including some areas, which had never burnt before (Otim, 1994) (Figure 6). Fire has also been one of the main concerns of the management of Mgahinga Gorilla NP, with the slopes of Muhavura being particularly susceptible. In 1985 a particularly bad fire reached the afro-alpine heath vegetation.



	Location	Cause	Duration	Com'ty assist'ce
1	Rukubira	A Honey hunters	1 week	none
2	Muhabara	A Farmers	1 week	helpful
3	Kibirangwa	A Graziers	2 weeks	helpful
4	Nyamissamba	A Honey hunters	1 week	helpful
5	Karrangara	Intended	1 week	none
6	Ishasha Gorge	Intended	1 week	none
7	Amuhingo	Intended	1 week	none
8	Ishaya	Intended	4 days	helpful
9	Kabuga	A Farmers	2 weeks	helpful
10	Murushura	Intended	1 day	helpful
11	Kaserasere	A Beekeepers	2 days	helpful
12	Near Ruhija	A Beekeepers	½ day	helpful
13	Bugurama	A Farmer	1 day	helpful
14	Kasuri	A Beekeepers	1½weeks	helpful
15	Nyondo	A Beekeepers	3 days	helpful
16	Bukirobwomugo	A Honey hunters	3 days	none

Cause: I = Intended, A = Accidental

Figure 6 Areas of Bwindi Forest burnt in March 1992

During the early 1990s Mgahinga National Park was one of the most well patrolled parks in Uganda, with the highest ranger to area ratio of any park. Despite this the park staff could not completely control illegal activities. At Bwindi, with a boundary of 115 kilometres and a patrol staff of 24, the situation was even more difficult to control. During one of the management plan workshops for Bwindi, one of the community representatives, John Tindiwegi, said:

> "The reality is, no matter how many rangers you have you will not be able to control people going into the park. Timber is coming out of the forest even now."

Following the establishment of the WWF Impenetrable Forest Conservation Project in support of the Game Department, open conflict occurred between Game Guards and local communities. In Mpungu Parish, for example, community members were on permanent standby to warn pitsawyers and gold miners of the approach of patrols. On a number of occasions violence erupted and game guards were attacked and beaten. At public meetings local people registered their hostility towards the conversion of Bwindi Forest Reserve into a National Park. During one such meeting to discuss the issue, a Mpungu Parish community leader said:

> "In short the response of all these people is extremely negative...I wonder why these innocent Ugandans should be made to suffer by creating a National Park in such a Forest Reserve? Licensed pit-sawyers operating in this forest reserve are the only source of employment to the local population. Where else shall we get our school fees and money for graduated tax if we are deprived of such opportunities?" (Hamilton *et al.*1990).

During a series of community interviews held in December-January 1991/2 prior to a socio-economic survey, considerable hostility was expressed towards the National Park and there were direct threats against the gorillas themselves.

> "When you mention the National Park we want to vomit, nothing you ever say will change our minds." "Gorillas should be put in cages and taken to zoos."

Revealing the community reality and depth of emotion regarding the management of the two parks helped to confirm the importance of the participation and reconciliation approach, and the need to reduce tension through mechanisms such as resource use.

3.1.2 Management plan objectives

Both management plans developed objectives related to the community use of resources from within the parks. At workshops for the Bwindi plan, community representatives identified the ideal objective as:

> "Local people manage the resources of Bwindi Impenetrable Forest."

They, however, recognised that there were many constraints to achieving this, which included a lack of local awareness of the importance of conservation, how to conserve resources, their economic values, and alternatives to using forest resources. They also recognised there are conflicts of interest within and between communities, between local, national, and international interests, between short and long-term interests and between political, economic and conservation interests.

The realistic or "Operational Objective" for the community liaison and utilisation section of the plan was subsequently formulated as;

> "The local people, together with Uganda National Parks, manage Bwindi Impenetrable National Park to ensure the conservation of biological diversity and the sustainable use of resources." (Wild and Serugo, 1993).

Community representatives recognised even before collaborative management was discussed, that a partnership between local communities and Uganda National Parks was essential for effective management.

At Mgahinga National Park (UNP, 1994b), a hierarchy of objectives was developed (Appendix 2). The Overall Goal of the Park was "Biodiversity in Mgahinga Gorilla National Park maintained or enhanced". The Plan Purpose for the 5-year life of the plan was:

> "Conservation and sustainable management of natural resources in Mgahinga Gorilla National Park and adjacent areas improved."

Meanwhile the lower order objective related to resource use was stated as:

> "Appropriate multiple-use systems and procedures established."

3.1.3 Park zones

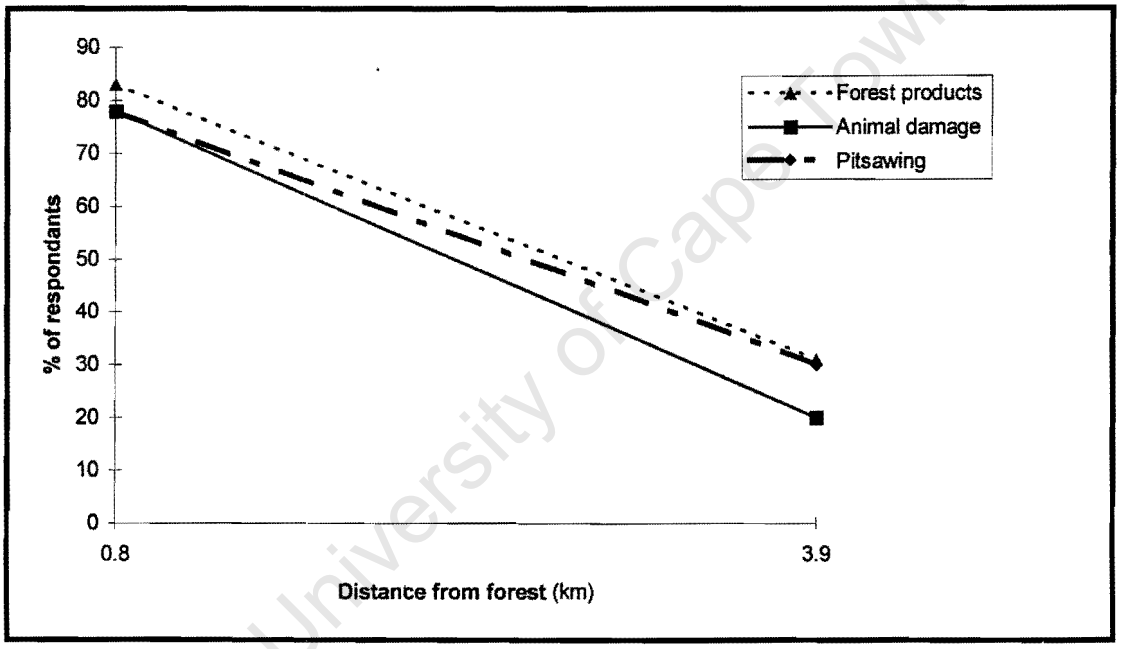
Outputs of both plans were park zones (Figures 7 & 8). Four main zones were identified;

- a high protection zone (core conservation area),
- a tourism zone for controlled gorilla tourism,
- a multiple-use zone for community use of resources (20% of total area),

- a sustainable development zone or area, outside the parks boundaries.

At Mgahinga local communities associated the word zone with eviction so the term used was "area". These zones gave geographical expression to the "use and substitute" principle, that is low impact utilisation within the park and substitution of resources outside the park.

The boundary of the sustainable development zone was set at two administrative parishes from the park boundary. This included most of the people that were affected by the park or affected the park as derived from questions asked in the Development Through Conservation baseline survey (Figure 7)(Wild, 1993).



Mean percentage of respondents from forest adjacent sub-parishes (centre of sub-parish 0.8 km from forest edge) and forest non-adjacent sub-parishes (sub-parish centre 3.9 km from forest edge) collecting forest products or pitsawing as a household activity, or household crops damaged by forest animals (households surveyed n=1405).

Figure 7 Distance from forest with forest related community.

The survey carried out by the Makerere Institute of Social Research was stratified into forest adjacent and non-forest adjacent sub parishes and the results summed for these two categories. To develop a graphic representation I calculated the average distance from the forest edge to the centres of the sub-parishes, and averaged these for forest and non-forest. If a geographical position had been collected at each household the graph would most likely be a sigmoid form. At an average of 0.8kms from the forest around 80% of

households were either engaged in pitsawing, collected forest products or suffered crop damage by forest animals. By an average of 3.6km this figure had fallen to about 30%. The two parishes from the forest selected to be the sustainable development area in the management plan, extended on average 10km from the forest, and therefore included most of the community members with an interest in the forest.

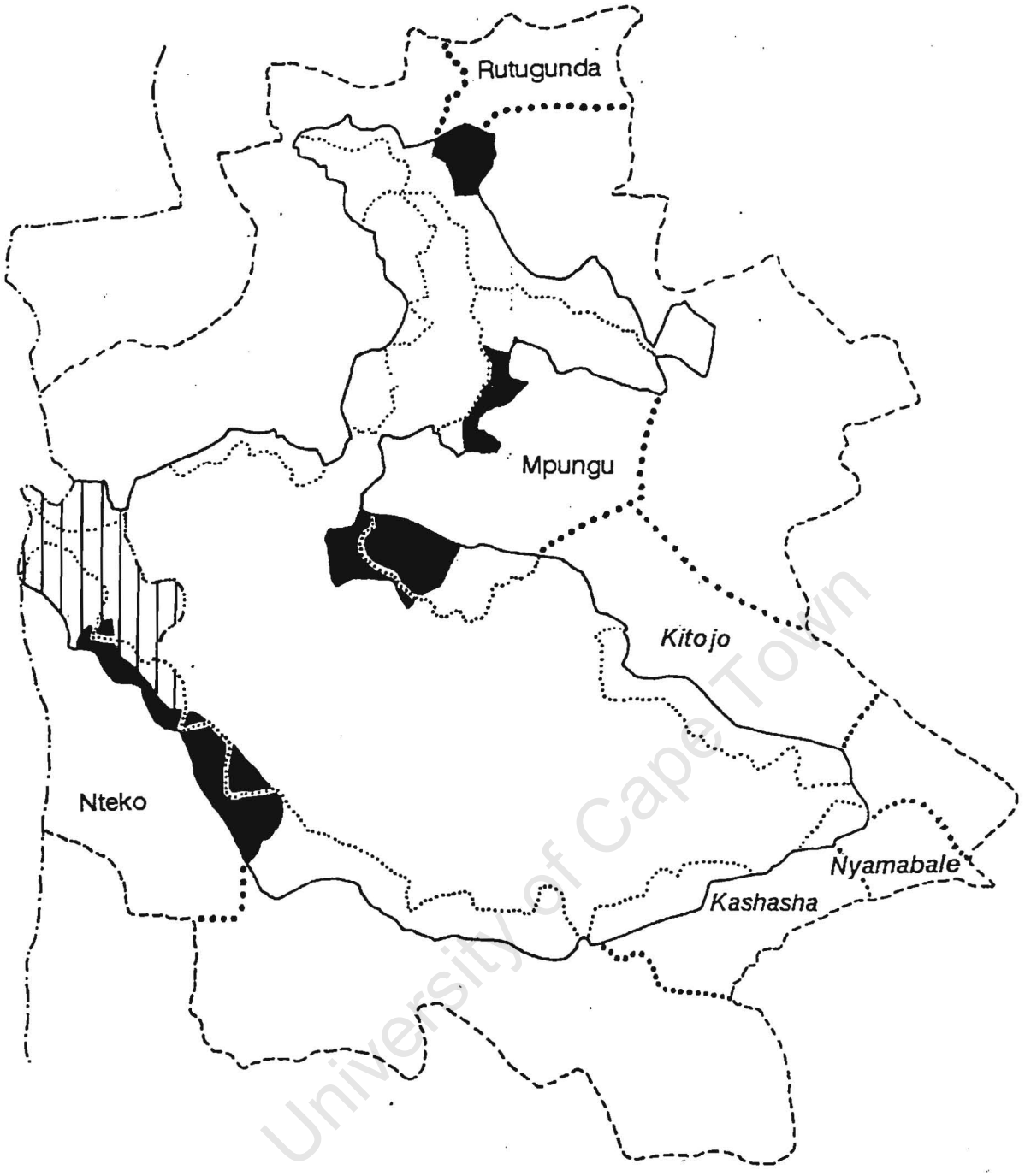
3.2 Establishing resource use at Bwindi

The process of resource utilisation started later at Mgahinga than at Bwindi. By mid 1994 only some limited collection of bamboo rhizomes for on farm planting had taken place, and not much development has taken place since. The remainder of this results chapter focuses on the activities at Bwindi Forest.

Having set the overall objectives and zoning plan in the management plan for Bwindi, the next step was to implement resource use. Resource use was established in two parts, firstly non-extractive beekeeping and secondly extractive use of medicinal plants and basketry materials.

These two different stages were implemented in different ways and provide a useful comparison. The beekeeping parishes (Figure 8) were selected based on the area that beekeeping was carried out for many years, but stopped after the creation of the National Park.

Establishing beekeeping was the first activity initiated and did not require the assessment of off-take levels of forest plants. Consequently it was not established in the same detailed way that extractive resource use was. Park staff held meetings with beekeepers, beekeeping groups were formed, a list of regulations were jointly drawn up and identity cards issued to members that were registered by the beekeeping society. This approach represented a mid-way stage between no control of beekeeping, as earlier implemented by the Forest and Game Departments, and high control of extractive resource use that was



Key

- international boundary
- national park boundary
- parish boundaries

BINP Management Plan zones

- high protection zone
- tourism zone
- potential multiple-use zone
- sustainable development area

Zones following JM negotiations

- Negotiated multiple-use zones
- potential multiple-use zone reverting to high protection zone

Nteko extractive use parish

Kitojo beekeeping parish

Figure 8 Management zones and multiple-use pilot parishes Bwindi National Park

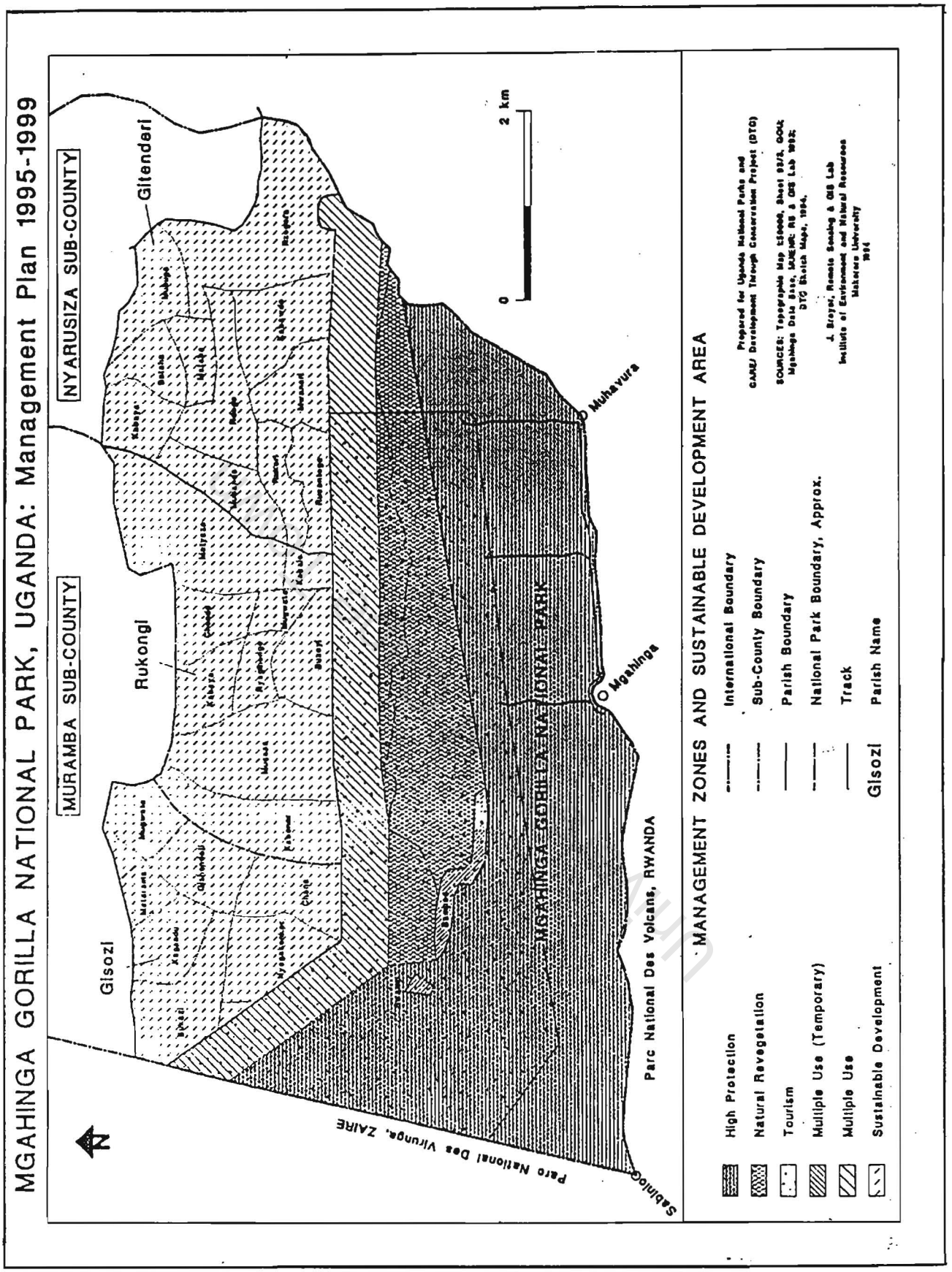


Figure 9 Mgahinga Gorilla NP management zones and sustainable development area.

developed subsequently by Uganda National Parks. It differed from the latter approach in that negotiations were held with beekeepers only and not community leaders (although some beekeepers were community leaders), and no co-management agreement was developed. The beekeeper groups vetted their own membership with little park input.

3.2.1 Parish Workshops

The tools for establishing extractive resource use were applied in the parish workshops, which consisted of a series of 3-5 day meetings in the parish, usually held at a school or

Criteria	Mpungu	Rutugunda	Nteko
Assess/minimise interactions with mountain gorillas	gorillas		gorillas
Assess/minimise interactions with rare trees (Isahsha Gorge)		Ishasha	
Worst relationships with the park in the past.	v.bad	poor	poor
Batwa equity issues		Batwa	Batwa
Range in population density,	high	medium	lower
Range of length of community establishment,	long	medium	recent
Range of forest/people ratio.	high	low	medium
Areas not benefiting from tourism or beekeeping.	no benefit	no benefit	no benefit

Table 5 Criteria for the selection of pilot parishes

health centre. Their main outputs were joint management agreements with the communities over resource use. A flexible sequence of PRA and related activities were developed during the parish workshops (Figure 10). The extractive use parishes were selected using a number of criteria (Table 5).

3.2.1.1 Attendance, numbers and gender

Attendance data was collected for 9 of the 13 Parish workshop days. As each of the day's activities lasted from between 9am - 5pm, participation varied throughout the day. Usually starting with lower numbers peaking during the middle of the day and declining at the end of the day. Records were kept of starting numbers and maximum numbers, of men and women. Participants were not asked to register (which would most likely to have been

seen in a negative light) and so the figures gathered represent an underestimate. The average maximum attendance was 49 people. The range in maximum attendance was 26 up to 80 people. Men were in the majority, making up 80.1% of participants.

3.2.1.2 Introductory exercises

The introductory activities aimed to create a positive atmosphere to start the meetings. The reason for the meeting was explained, and everyone introduced themselves. Resource users often used the introductions as a means to vent their anger at the park.

> "My names are Ndemeye Matayo, I used to get enshuri (*Smilax anceps*) from the forest when it was ours, then it was taken away and now I am starving". "You ask me to introduce myself, but I don't know what to say because the chimpanzees are chasing me out. I used to survive on herbs and honey, first you stop me getting the herbs and now the chimps steal my honey."

These introductions reflected local concerns, while the exaggeration and provocation had the meeting laughing. The response of the multiple-use team was watched keenly by community members for inappropriate responses (e.g. defensiveness or anger). To introduce the national park a flannel board was used (Linney, 1995). Pictures (backed with sandpaper) depicting elements of the park and its resources were handed out. The participants came up, described them and placed them on the board that was covered with towelling (Photo 2). People often emphasised the importance of the item and expressed resentment at its loss. Community members were reticent to mention illegal activities in front of park staff, but by including pictures of these same illegal activities, participants were reassured that it was safe to talk about them. This promoted openness and free discussion. The use of a visual communication method allowed wide participation, including those that couldn't read.

The community events and forest history (time line) identified key historical events (e.g. Table 6). The activity began the process of the conflicting parties working together, and provided useful background to the parish. On the first occasion, we tried to split into small groups, but this was seen as trying to divide the community. Subsequently the first activity was always carried out with the whole group, no matter the size of the gathering so as to build trust.

To develop resource availability and population trends (trend analysis), "stick graphs" were produced by groups of elders. Stick graphs use relative lengths of stick to represent the availability of resources in the parish over time. The elders quickly grasped the principle and enthusiastically developed the graphs (Photo 3). Food was the first graph to be produced, an important and uncontroversial item (Figure 11). Graphs of trees and herbs on the farm and in the forest were then constructed. The community's perception of forest

1941	The government allowed pitsawing in the forest, by giving licences.
1942	Locusts ate all the crops, resulting in famine.
1946	A sub-county chief set all the Batwa huts on fire, beat the Batwa and they all ran away to other areas.
1946 - 1980s	The government allowed people to cultivate in the forest, in return for planting trees.
1951	The Batwa living in the forest started getting vaccinations against a diseases called Ebinyoro.
1991	The Church of Uganda brought Batwa back, bought them land and preached them the gospel.
1992	Hailstones destroyed all the gardens and in the end there was famine.
1993	People in Rutugunda Parish started getting vaccinations against river blindness.

Table 6 Example of key events in community and forest history, Rutugunda Parish

trees often differed from that of the team. The community claimed they did not know what was currently in the forest, as they were not allowed to go there and they supposed much tree regeneration presumably hoping for a resumption of pitsawing. The exercise was also another opportunity to express the negative effects of the park. At the end of the exercise the group was asked if they would like to plot the trend in the human population, usually a sensitive issue. In all cases they agreed willingly. These graphs showed population increase modified by immigration and emigration.

3.2.1.3 Resources, users and areas

The next group of co-management activities produced more detailed information and moved into the planning stage by identifying users, multiple-use areas and species for harvesting. Identifying resource categories and ranking them in order of importance was

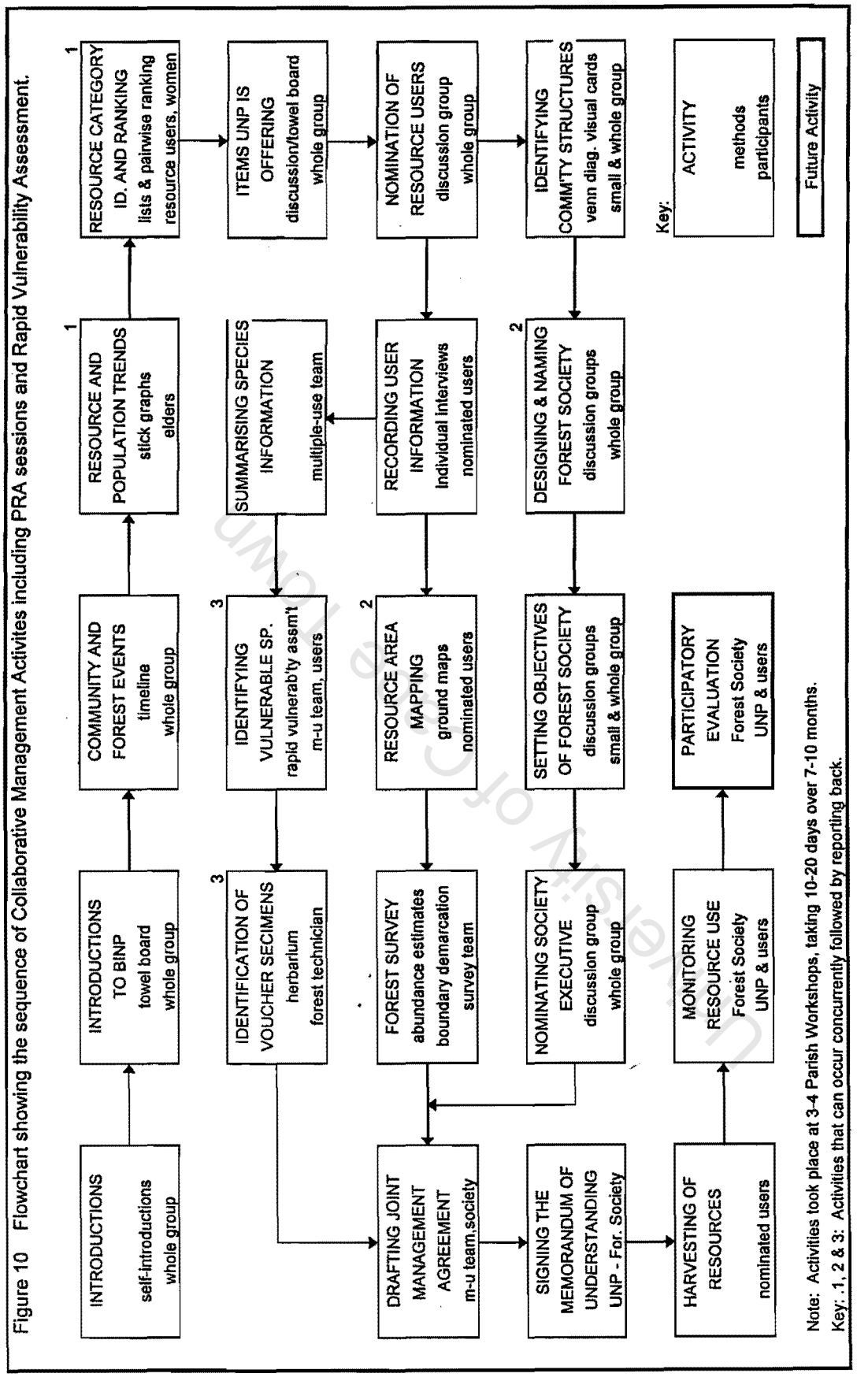


Figure 10 Flowchart showing the sequence of collaborative management activities

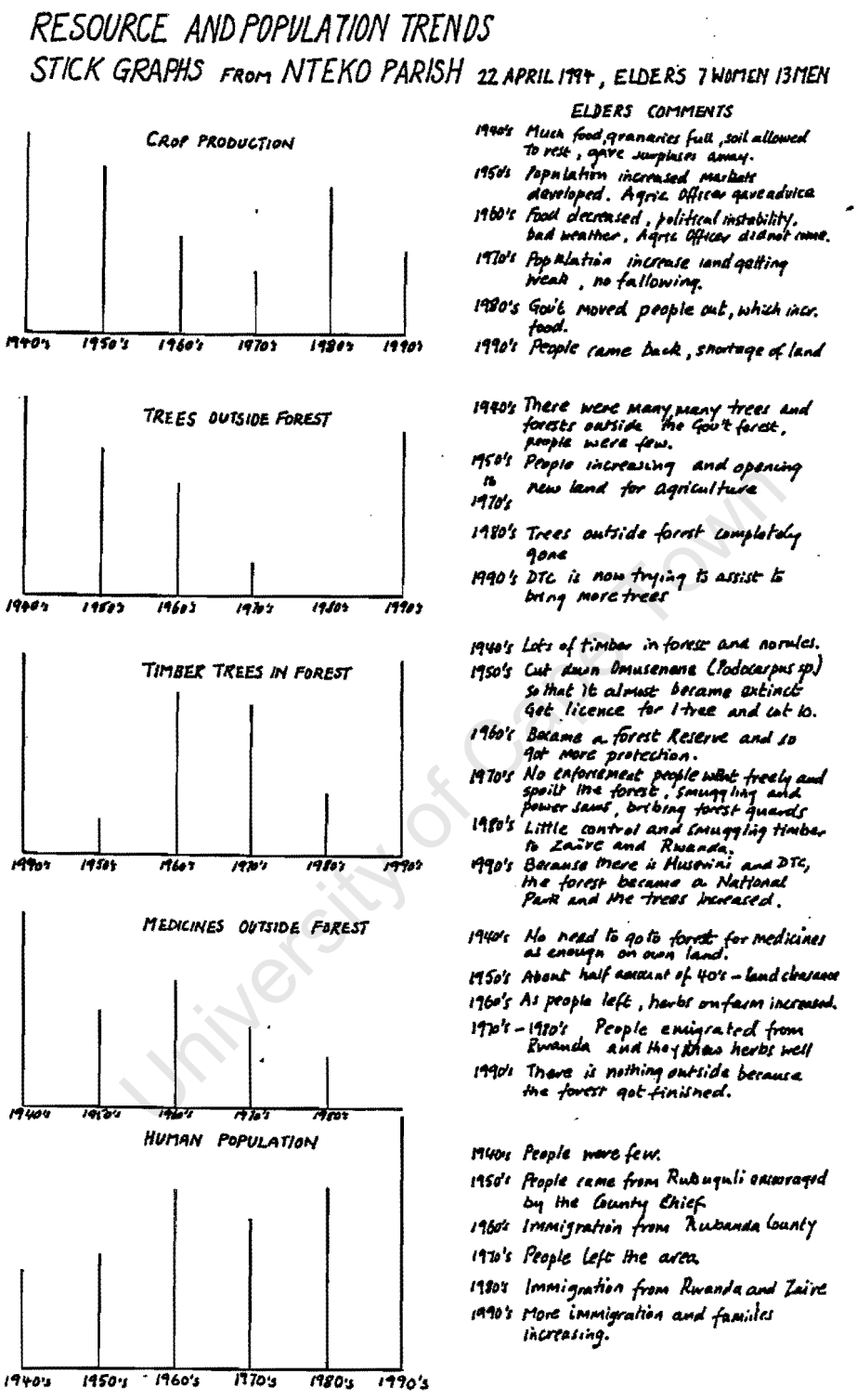


Figure 11 Resource trends graphs, Nteko Parish

carried out in small groups. Women carried out the ranking separately from the men to highlight any gender differences. Resources were identified by brainstorming sessions and the resulting resource list was subsequently discussed to arrive at community resource categories. These resource categories were then ranked using either discussion or the pair wise ranking technique. Pair wise ranking using local materials on the ground, took the analysis deeper and revealed more species information. It, however, took longer to carry out. In some cases people chose not to rank the items they felt were not up for discussion, such as timber and gold, saying "we will not be allowed to use these so why bother to talk about them" (Table 7).

Rank	Mpungu	Rutugunda	Nteko	
	All	All	Men	Women
	10/6/93	5/4/94	23/4/94	23/4/94
1	medicinal plants	basketry	medicinal plants	medicinal plants
2	basketry	medicinal plants	Kayonza Road	basketry fibres
3	beer boats	water for stock	*enshuri*	Kayonza Road
4	firewood	firewood	timber	bean stakes
5	bean stakes	tree seeds	*omujega*	tool handles
6	beehives	food	bean stakes	firewood
7	fruit		building poles	fish
8	mushrooms		vegetables	mushrooms
9	honey		fish	fruit
10			gum	
11			water	
12			meat	
13			beehives	
14			hoe handles	
15			fuelwood	
16			beekeeping	
17			honey hunting	
18			raffia	
19			*ekihama*	
20			gold	

enshuri = Smilax anceps omujega = Loeseneriella apocynoides ekihama = Dioscorea sp. Tuber
food = tubers, stingless and honeybee honey, fish
tool handles = hoe handles, pounding sticks, walking sticks
Rutugunda: women ranked firewood first; Batwa ranked firewood first and food (tubers) second.

Table 7 Importance ranking of forest products to user groups, in resource use categories

3.2.1.4 Items Uganda National Parks permitted for use

It was potentially difficult to present the Uganda National Parks decisions of what was on offer (medicinal & basketry plants, footpaths and mineral springs), as access to resources was the nub of the issue. The response would indicate whether items on offer were of sufficient interest to the community to make joint management worth their while, as

compared to the items that would remain prohibited (hunting, timber, poles, firewood etc.). The approach taken was first to elicit the community views as to which items they thought the park authorities would allow.

	TO BE ALLOWED	UNDER CONSIDERATION	NOT TO BE ALLOWED
COMMUNITY VIEW	medicines basketry honey firewood fruits stock watering	mushrooms fish footpaths gum	meat timber hunting bean stakes gold building poles
UGANDA NATIONAL PARKS HQ APPROVED	medicines basketry beekeeping footpaths	mushrooms fruit fish stock watering gum	meat timber hunting bean stakes firewood gold building poles

Table 8 Results of session on "What Uganda National Parks would allow".

The flannel board was set up and individuals invited to place the pictures of the resources under the appropriate heading (Table 8, example from Rutugunda Parish, 7/4/1994). Many made comments as they put the items on the board.

> "Hunting is not allowed, so the poachers will not be accepted to go to the forest to kill animals with their dogs." "I know there are medicines in the forest which can cure some diseases, so we are begging to be accepted to go to the forest." "Fish are also animals, so I am doubting if they will be accepted but we should all pray hard so fishing will be allowed." "Bean stakes are got from trees in the forest so they will not be accepted." "In order to survive we need to cook food, so here the park will allow us to collect firewood."

Once the community members had placed the pictures on the board in their chosen categories, the park warden then discussed each item. As he discussed he moved those for which the community opinion differed from the UNP's initial position (Table 8). As each one was moved the reasons for the move were given. Each item discussed was accompanied by either applause, discussion, grumbling or open dissent. As resources that had not been previously considered arose and for which Uganda National Parks had not made a decision, a third category of "under consideration" was established. On the whole

people were at least partially satisfied with what was on offer, saying, "let us work with this and see what the future brings."

It was pointed out that within approved categories each species would be assessed to ensure that extraction did not exhaust supply. Items that were not currently permitted would be the subject of extension and research work done by Development Through Conservation and Institute of Tropical Forest Conservation, to provide alternatives or encourage on-farm cultivation.

3.2.1.5 Numbers and nominating resource users

Deciding how many resource users and who should harvest from an area were important steps, affecting the harvest quantity and the community behaviour in the forest. Contrary to expectation, the community willingly discussed severe limitation on numbers of harvesters to be allowed to collect from the forest. For the two Mpungu multiple-use areas (c.9 km^2), for example, the numbers of basket makers discussed ranged between 2 and 20. Following the discussion the community nominated 22 basket makers. As this figure was not high, the final decision on number of resource users we left until more details on species and its abundance in the harvest areas were collected. Following that work, the multiple-use team felt the resources could sustain all the nominated users, and this proved to be the case with all the pilot parishes. The nomination process therefore proved to be self-limiting.

Nominations were suggested, discussed and either accepted or rejected by consensus. Criteria for nominations were; that users be the recognised experts of their trade, provide good quality, fair service, and be responsible and reliable individuals. In Mpungu parish data was collected from 129 people (85 basket makers, 44 herbalists) interested in harvesting, but only a total of 39 users were actually nominated. To avoid the over collection of data in other parishes, the nomination sessions were brought forward, and data collected from nominated users only.

Having arrived at a list of nominated resource users the parish workshop activities split into two main areas of focus, one dealing with the species information and harvesting areas, and one dealing with management issues and how harvesting would be controlled.

3.2.1.6 Resource user (key informant) interviews

User interviews provided much valuable data for establishing resource use. Two approaches were tried; group sessions and individual interviews. The group sessions were less effective as most people were idle while one user was talking about his or her activities. Users also affected the answers of each other. Herbalists do not like to divulge "their" species, and one group session revealed only 17 medicinal species in use, while 49 species were identified from individual interviews in the same sub-parish. Individual interviews were adopted as the main technique, and were carried out separately but simultaneously to a group activity. The information collected included the user name, home area, the species collected, quantities used, locations collected from and products made, species ecology, and estimated numbers of harvesters for sustainable harvesting (user data to be compared amongst users and with the estimates of the park staff). The data was recorded on raw data sheets, and transferred to summary sheets (Table 9).

NAME	PRODUCTS	# MADE	SPECIES	HABITAT	LOCATIONS	QUANTITIES	SEASON	LIFE FORM	PART USED
Idah Bakampata	Ebiibo	2 / month	Ebitatara	Forest	Omumarago	1 dry hand bund.	Dry season	Shrub	Stem/stick
			Emiiru	"	"	"	"	"	Bark
			Obukogoso	"	" and Kako	"	Dry season & no moon	Herb	Stem
			Obutami	Swamp	Kiizi	"	Dry season	Shrub	Bark
	Entemere	1/ month	Efunjo	Swamp	Kiizi	5 bundles (dry)	Dry season	Shrub	Bark
			Obutami	Swamp		20 dry hand bundle	"	"	"
	Omukyeka		Eminaaba	Forest boundary	Rutabarwe & Kako	10 dry hand bundles	Dry season	"	Bark
			Omugugu	Swamp	Kiizi	"	"	Grass	All of it
Peace Basheka	Ebiibo	4/ month	Ebitatara	Forest	Omumarago	2 dry hand bundles	"	Shrub	Stem/stick
			Emiiru	"	"	"	"	"	Bark
			Obukogoso	"	" and Kako	"	"	Herb	Stem
			Obutami	Swamp	Kiizi	2 dry hand bundle	"	Shrub	Bark
			Enfunjo	"	Kiizi	2 bundles	"	"	"
	Engari	3/ month	Obutami	"	"	60 dry hand bundles	"	"	"
			Enfunjo (ekitogo)	"	"	15 bundles	"	"	"
Lydia Bakankunda	Ebiteebo	3/ month	Eminaaba	Forest boundary	Rutabarwe & Kako	10 dry hand bundles	"	Shrub	Bark

ebiibo = millet basket, entemere = grinding basket, omukyeka = mat

Table 9 Example of data from individual interviews with nominated resource users

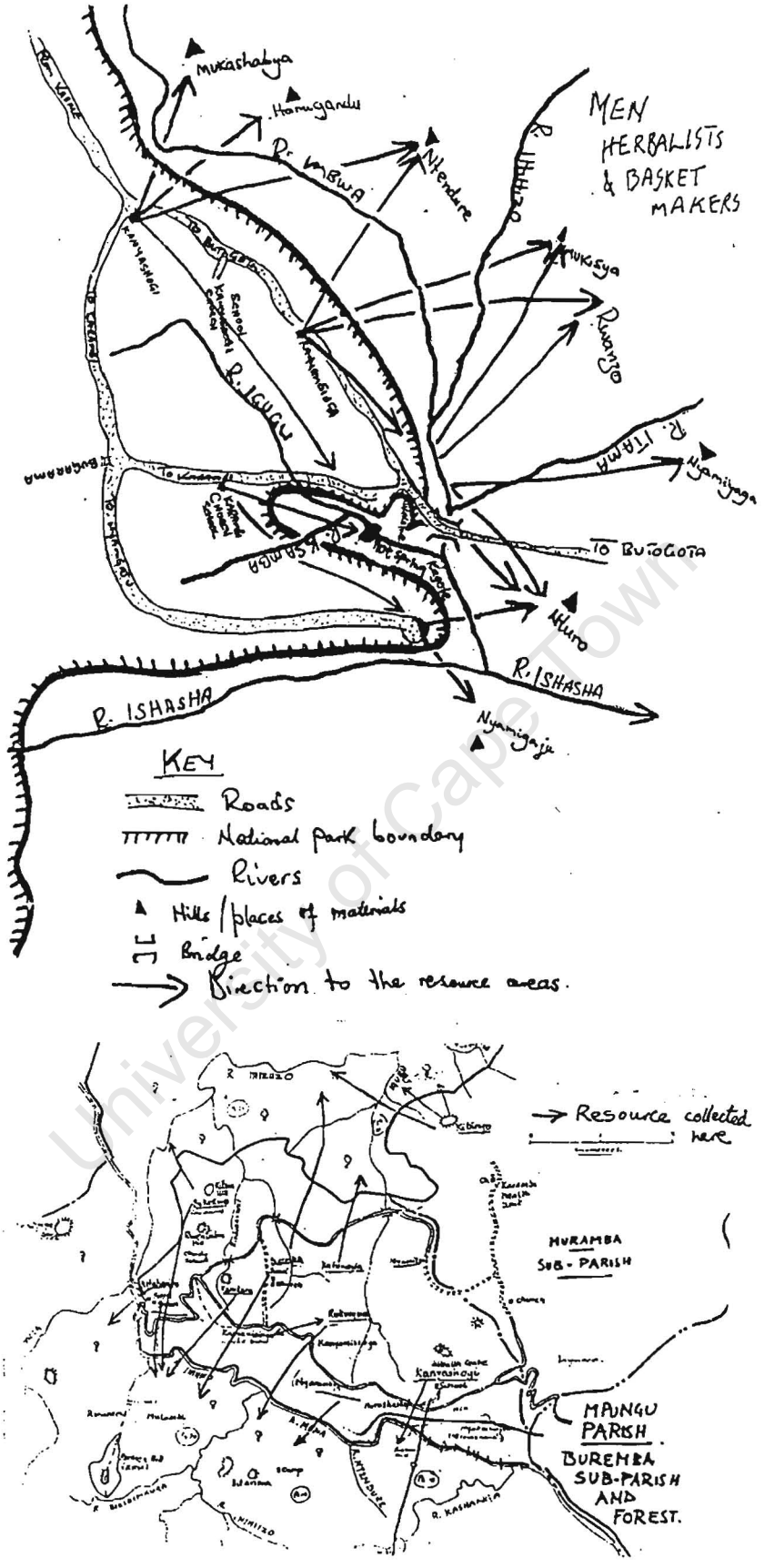


Figure 12 Ntendure multiple-use area, user and team maps Mpungu Parish

3.2.1.7 Ground maps

Ground maps were drawn by groups of users to identify potential multiple-use areas. The maps included villages, roads, the forest boundary and features in the forest and was produced using local materials (Photo 4). Locations of the key species were indicated using flowers or leaves. The main resource and boundary locations were discussed. These maps were transferred onto flipchart papers and later information transferred onto the base maps taken from the government survey maps (Figure 11). These maps then provided the basis for the maps that formed part of the Memorandum of Understanding between communities and Uganda National Parks (Appendix 4). Following ground map production a smaller team was identified to join the park staff for forest surveys.

3.2.1.8 Forest surveys

During forest surveys the nominated survey team visited the areas identified in the ground maps, examining resources and confirming or modifying boundaries (Photo 5). At the edge of the forest, the users made abundance estimates of demanded species for that area of forest (Table 10). Abundance was estimated for the species both on the farm and in the forest. Those species common on farms were not considered for resource use. These user abundance assessments were compared with multiple-use team knowledge of the species and discussed with local patrol rangers. On the whole the user and team abundance assessments compared favourably. Users, however, consistently estimated abundance at one level higher than those of the team. A species we considered "occasional" resource users would estimate as "frequent" and so on. The estimates were also confirmed, as far as possible, during the forest survey itself.

It was not possible to cover more than a small part of the forest during these surveys and so the focus was on vulnerable species identified by the rapid vulnerability assessment. Resource users would draw to the attention of the multiple-use team any demanded species and the ecology, distribution, abundance and use were discussed. Specimens were collected of new species.

Local name	Botanical name	Life form	Abundance in forest	Abundance in village
Omwiha	*Ocotea usambarensis*	Tree	F	-
Rukukota	*Piper guineense*	Climber	F	-
Nyakibazi	*Rytigynia kigezensis*	Tree	O	-
Omuhanga	*Maesa lanceolata*	Tree	O	A
Omuyovu	*Entandrophragma* sp.	Tree	F	R
Omujesi	*Hagenia abyssinica*	Tree	F	R
Omkarara	*Unident.*	Climber	O	-
Omuguruka	*Maesopsis eminii*	Tree	O	-
Omuna	*Sericostachys scandens*	Climber	A	R
Omushasha	*Macaranga* sp.	Tree	F	O
Kitkye'ihamba	*Unident.*	Shrub	F	-
Isubyo	*Unident.*	Climber	F	-
Kitinwa	*Unident.*	Creeper	-	A
Ekizimyamuriro	*Crassocephalum* sp.	Climber	R	A
Omumara	*Unident.*	Climber	-	R

Table 10 Abundance estimates of medicinal plants by nominated survey team, Nteko Parish

The boundaries identified on the ground maps were walked on the ground, except where they were very obvious. The boundaries followed known landmarks; rivers, hills and major footpaths. Footpaths were not originally considered for multiple-use area boundaries, as they were not marked on the maps that were available, but proved useful as they were well known by the community having been established by long usage. The rangers used these paths for patrol and could detect people crossing out of the multiple-use areas and moving deeper into the forest. To decide the multiple-use area boundary, the locations of resources were examined in relation to clear boundaries, gorilla home ranges and the aim of limiting the overall area of the multiple-use zone to the 20% approved by UNP. On the spot negotiations between park staff and resource users were important to achieve appropriate changes to the areas.

Due to the large areas and difficult terrain, it proved difficult to evaluate the species and identify the boundary during the same survey. Identifying the boundary was given first priority. Species assessments were made as the boundary was walked and follow-up visits made for vulnerable species.

3.2.1.9 Forest societies

In the establishment of resource use at Bwindi the active involvement of participating communities in management was a central principle. The ideas behind community management included:

- Community members often have detailed knowledge of the resource.
- In most circumstances they are better able to control their own members than park officials.
- Involvement of community members would improve their relations with the park staff.
- The modalities of community participation in the management of resource use depended on finding the appropriate institutional framework at the community level. This involved a three step process, firstly to identify existing community institutions and secondly to evaluate how these institutions interact with the forest and how they might play a role in the management of forest use activities. Thirdly to examine any modifications that might be needed to establish resource use.

To identify community organisations during the parish workshops, small groups listed the organisations operating within the parish, which were then written on individual cards. In a large group meeting the cards were handed out to any one who wanted to take one. They were brought up one by one, placed on a board and a short discussion was held, facilitated by a community leader, as to how the groups should be classified in relation to the forest (Table 11). We tried to understand the nature of these groups and how they fitted in with local government and the geography of the parish (Table 12).

PRIMARY GROUPS	SECONDARY GROUPS
Farmers groups (wildlife crop damage)	Abataka
Herbalists	Self-help projects
Stretcher groups	RCI and RCII
Women's craft groups	Local Chiefs
Grazing societies	Youth and sports groups
Child welfare groups (nutrition)	Savings and credit
	Extended family

Table 11 Groups that are affected by or affect Bwindi Impenetrable NP, Nteko Parish

GEOGRAPHICAL AREA	COMMUNITY	NATIONAL RESISTANCE MOVEMENT	LOCAL GOVERNMENT
Parish		Resistance Council II (RCII)	Parish Chief
Sub-Parish (2 in Nteko)			Sub- Parish Chief[2]
Resistance Council I (RCI)	Stretcher societies[1]	RCI[1] 8 in Nteko	
Ridge or Hill	Abataka[1]		
Abataka	Extended family Household Savings & credit groups Work groups Self help groups Women's crafts groups		

(1) These groups have been identified for community management of utilisation.
(2) Sub - Parish chiefs retrenched in 1994 as part of structural adjustment programme.

Table 12 Community groups and organisations within Nteko Parish, in relation to geographical area

3.2.1.10 Description of community management organisations

The discussion then moved on to which group should manage the utilisation activities. In each of the three parishes a different but closely related institution was chosen, the abataka, the engozi (stretcher) groups and the Resistance Council I (RCI). A brief description of these community organisations will help understanding of their role in utilisation management.

Abataka

The Abataka is the traditional community organisation within the Bakiga and refers to all the responsible adults within a geographical area, for example a ridge or hill. Irresponsible adults, although living in the area, may be rejected from the abataka, and are then called "endeme". The Abataka can include related and unrelated families. Abataka leadership is drawn from community elders and has a chairman, secretary and treasurer. There is no exact English translation for abataka but they are village communities or citizens groups. The Abataka solve disputes and civil cases before they are taken to the RCI court.

Ebibiina bya'engozi

The ebibiina bya'engozi is the stretcher society or group. These formed in the 1980's to provide an ambulance service to health clinics. Membership is compulsory and there is a monthly fee. Due to the remoteness of the area a round trip to the clinic can be more than 50 km, and all members of the society are required to assist. To maintain this level of support, discipline is very tough. The penalty for being absent can be a drum of local beer (200 litres, US$ 30). In addition the societies provide funeral services, small scale credit, and deal with smaller cases such as land disputes. In some places the engozi and the abataka are synonymous.

The Resistance Councils

The Resistance Council (RC) system is peculiar to Uganda, and was introduced by the National Resistance Movement Government[11]. At the RCI level every adult member of the community (c.150 households) is a member of the RCI Council who elect a committee or executive of nine to manage the affairs of the village. All the committees in a civil parish (c.10) form the RCII Council, who similarly elect a committee of nine. The system develops similarly through Sub-County (RCIII), County (RCIV) and District level (RCV). The RCV Chairman is the head of the District. The RC system has built on the indigenous decision making structures, such that the abataka and engozi are sometimes nicknamed RC Zero, and has gained considerable acceptance in many parts of the country and allows significant local self-determination. There is a female "secretary for women" on each committee at each level, for the participation and representation of women. This is a greater formal level of women's participation that in most East African countries.

The District Administration

The District Administration is the civil service of the District and at the lower levels consists of Chiefs. Initially there was conflict between the Chiefs (appointed) and the RC's (elected), but their respective roles have now become established. Sub-Parish Chiefs were

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[11] Resistance Councils have now been institutionalised as a part of local government and disassociated from the National Resistance Movement, they are now called Local Councils

subsequently retrenched (laid off) and Parish Chiefs are now the lowest level of government administrator.

3.2.1.11 Development of forest societies

The three groups identified during the sessions to manage resource users, the abataka, the engozi and the RCI all had a secondary relationship with the forest, showing the importance of having both users and non-users involved in management. To manage resource use in all 20 parishes around the park, Uganda National Parks staff needed a

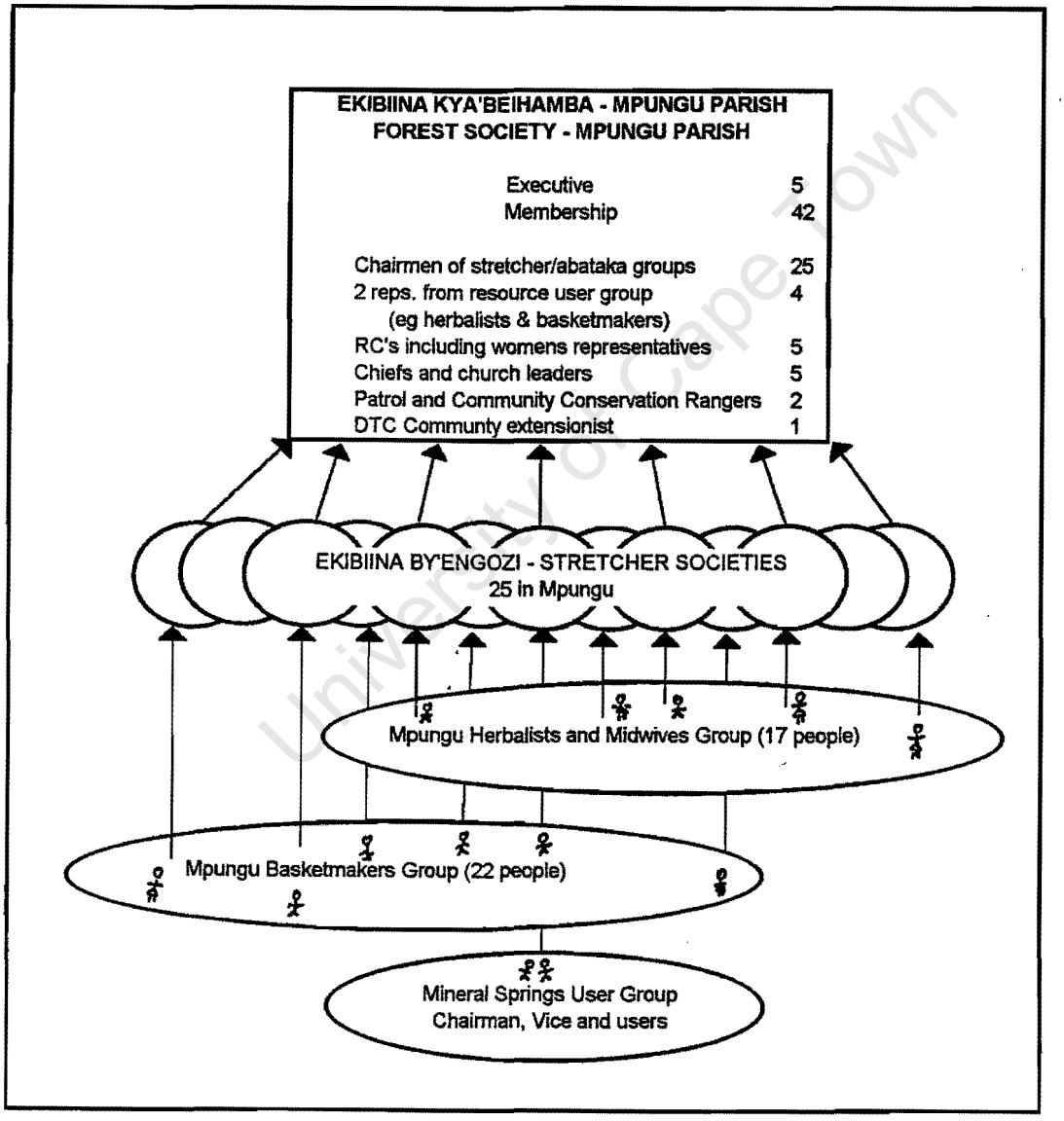


Figure 13 Forest Society - Mpungu Parish

single group per parish to interact with, whereas each of the chosen groups were many per parish. The existing parish level group, the RCII executive committee, was not considered appropriate as members were few and less directly involved with harvesting issues. It was, therefore, agreed to form a new institution in each parish, with membership drawn from the chosen institutions.

The membership and management of this new institution was formulated and the post-holders elected. The core of the members were the leaders of the selected community group with additional members drawn from nominated users, RC's, Chiefs, religious leaders, park and project staff (Figure 13). Each parish chose its own name for the new institution and the English "Forest Society" is derived from the first one, Ekibiina Kya'beihamba - Mpungu Parish (Forest Society - Mpungu Parish).

The operation of the society was developed during discussions. The idea of documenting decisions as a written agreement was enthusiastically embraced. These agreements were to become the Memoranda of Understanding or Joint/Co-Management Agreements. Small group sessions decided what the objectives of the society would be (Table 13). The society would also maintain records of the quantities of resources harvested through the secretaries of the engozi and abataka. It was agreed that each user would be issued with an identity card. The societies would meet at least three times a year and one meeting would be an annual general meeting, when all the resource users and the park warden would be invited.

3.2.2 Species and product case studies

The development of the joint management agreements was supported by follow-up work, data processing and case studies of key species. The case studies examined in more depth those species at risk of over-utilisation as revealed during the parish workshops and earlier studies. They were not full scientific studies (see section 2.2.5), but aimed to assist decision making, for relatively little field work time available to a conservation project with time constraints. They also provided recommendations regarding interventions that

- The objectives of the committee shall be as agreed:
- To protect and conserve Bwindi Impenetrable National Park
- To develop and maintain good relationships between the people of Mpungu Parish and the National Park staff
- To negotiate access to resources from the National Park and participate in developing a system to ensure their utilisation is sustainable
- To participate in determining the multiple-use areas and assessing and monitoring the levels of each species or resources in those areas
- To improve the communication between the National Park staff and the community and act as an information link
- To investigate the illegal use of resources and other illegal activities both inside and outside the multiple-use areas and take appropriate action
- To encourage the community to grow on their own land species that are not obtainable from the Park and other species as substitutes
- To collaborate with the Bwindi Impenetrable NP staff to find ways of controlling crop damage by wildlife
- To encourage the collaboration between the traditional herbalists and medical personnel
- To control the nominated resource users to ensure high standards for behaviour within the National Park and that the benefits of utilisation of resources are equitably shared amongst the community

Table 13 The objective of Ekibiina Kya'beihamba (Forest Society), Mpungu Parish

could reduce pressures on vulnerable species. *Loeseneriella apocynoides* (Omujega) was one of the case study species, a highly valued basketry species of limited distribution both within Bwindi forest and in East Africa as a whole. Another case study species was *Smilax anceps* (Enshuri) the most highly demanded basketry species all around the park (Scott, 1992) and used for a wide range of products (Photo 14). The product studied was the tea plucking-basket (Entete) (Photo 14, back right).

3.2.2.1 Case study 1. Loeseneriella apocynoides

The study site for this species was Mpungu Parish, one of the main areas where *L. apocynoides* is used.

Product descriptions

L. apocynoides was used in Mpungu for four products; tea plucking baskets, sorghum granaries, stretchers, and pot baskets. Tea plucking baskets (entete) come in pairs, a small basket carried on the back for plucking into, and a large basket for collecting with a

	Baskets	Granaries	Stretchers	Pot Bskt.	
Baskets per ha of tea	3.78	-	-	-	
Total items in Mpungu	749	1141	16(20^3)	1141	
Items required in Mpungu (No./yr)	872	114	2	114	
L.apocynoides per item (m)[1]	-	21.7	10.6	2.4	
L.apocynoides demand (kg/yr)	550	-	-	-	
L.apocynoides demand (m/yr)[1]		2476	21.3	274	Tot. stms/yr
L.apocynoides demand (stems/yr)[1,2]	210	309	2.6	34	**556**

Notes: 1. At standardised 30mm dbh, 2. Harvested stem length is 8m

3. All Societies desire to posses a stretcher and this was accounted for in demand calculations

Assumptions: 1. Average longevity of granaries, stretchers and pot baskets is 10yrs
2. Surface area of granaries is equivalent to an open ended cylinder of mean granary circumference
3. Surface area of a standard pot basket is equivalent to that of a sphere with diameter 40cm =0.5m^2
4. Surface area of a standard stretcher is 2.2m^2, 5. There are one granary and one pot basket per household

6. The average stems harvested were 8m in length

Table 14 Demand for *L.apocynoides* in Mpungu Parish

Locations

Loeseneriella apocynoides is patchily distributed some distance into the forest. It was recorded from three hills in the forest, Kasinga, Mururara and Makweshera of which Makweshera had the most abundant *L.apocynoides*.

Site features

Steeper valley sides appear to be the best site for the species particularly near to the valley bottoms, but not in the valley bottoms the vegetation of which is characterised by species of wetter areas, e.g. *Cyathea manniana, Neoboutonia macrocalyx* and *Brilliantaisia sp.* Altitude of *L. apocynoides* sites was high, ranging from 1880 - 1920m. Canopy ranged from 60 - 95% with no discernible pattern within this range.

Associated trees

The following data was collected from the plots. Local experts identified nineteen associated species of tree in the vernacular. Ten species were identified to genus or species in the field. Species not botanically identified were collected for later identification. The most abundant species were; *Syzygium guineense, Rawsonia lucida, Parinari excelsa,*

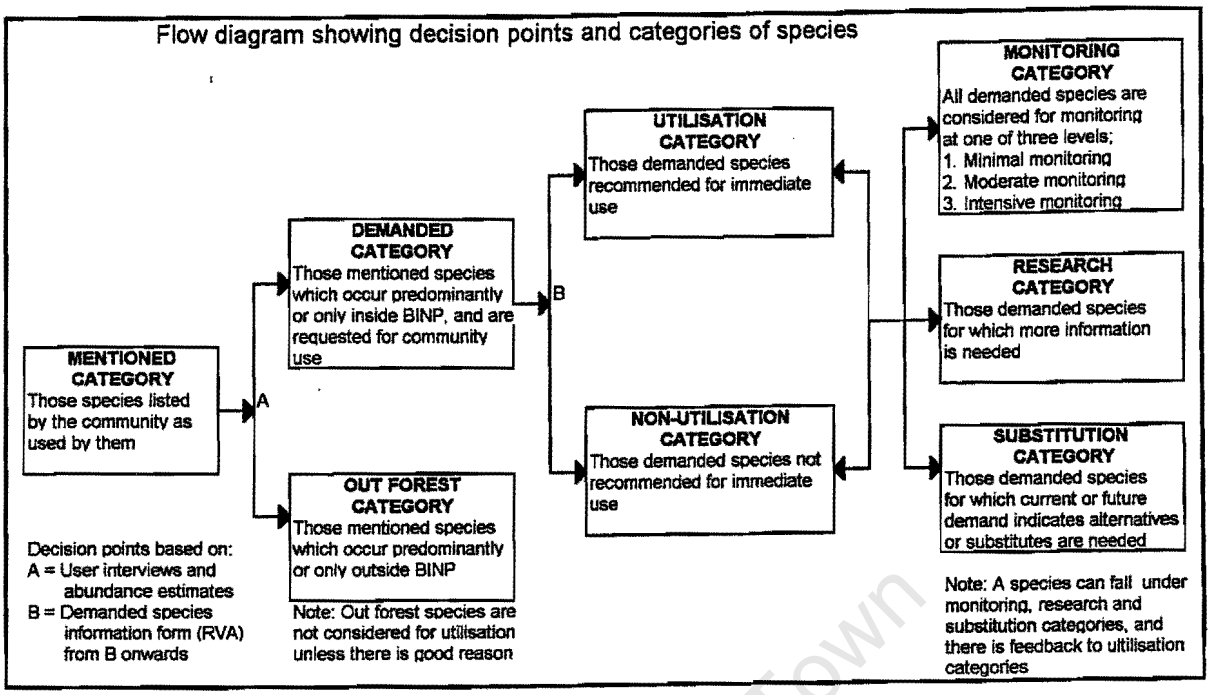


Figure 14 Flowchart showing decision points and categories of species

capacity of 50kgs. They are made from an open hexagonal weave. Granaries (ebihumi) are large closely woven baskets, up to two metres in height, with a closed base and an open thatched top. The granary circumference is the narrowest at the top, widest at the middleand then narrowing again to the base. In the side at the top a small opening is used for filling and emptying. Stretchers (engozi) are a woven 'bed' approximately 2m x 1m (Photo 13. They are an essential item in the locality for carrying patients to clinic and strong social institutions the Stretcher Societies carry out this activity. Clay pots are made in the area and to increase their longevity a basket is woven around the pot (kuranda inyungu). These items are called pot baskets or covers, in this study, and can increase the life of the pot from 2-4 to 10-15 years.

Demand

The results of the demand surveys (Photo 6) showed that should all these products be supplied by *Loeseneriella apocynoides* then 556, 8m long stems of 30mm dbh would be required per year(Table 14).

Strombosia scheffleri, Chrysophyllum sp., Carapa grandiflora, Omunyashandu and Omuherere. The basal areas of trees were calculated in the plots and plotted against total stem areas for *L. apocynoides*. There seemed to be no obvious pattern and due to the small sample size the analysis was not pursued.

Numbers of plants of Loeseneriella apocynoides

It was not easy to identify individual plants of *L. apocynoides* as stems often grew from different parts of the same root system. However, based on judgement, the numbers of plants were counted in each plot. The total number of individual plants varied from 31 - 600/ha for the different plots.

L. apocynoides *Size class distribution*

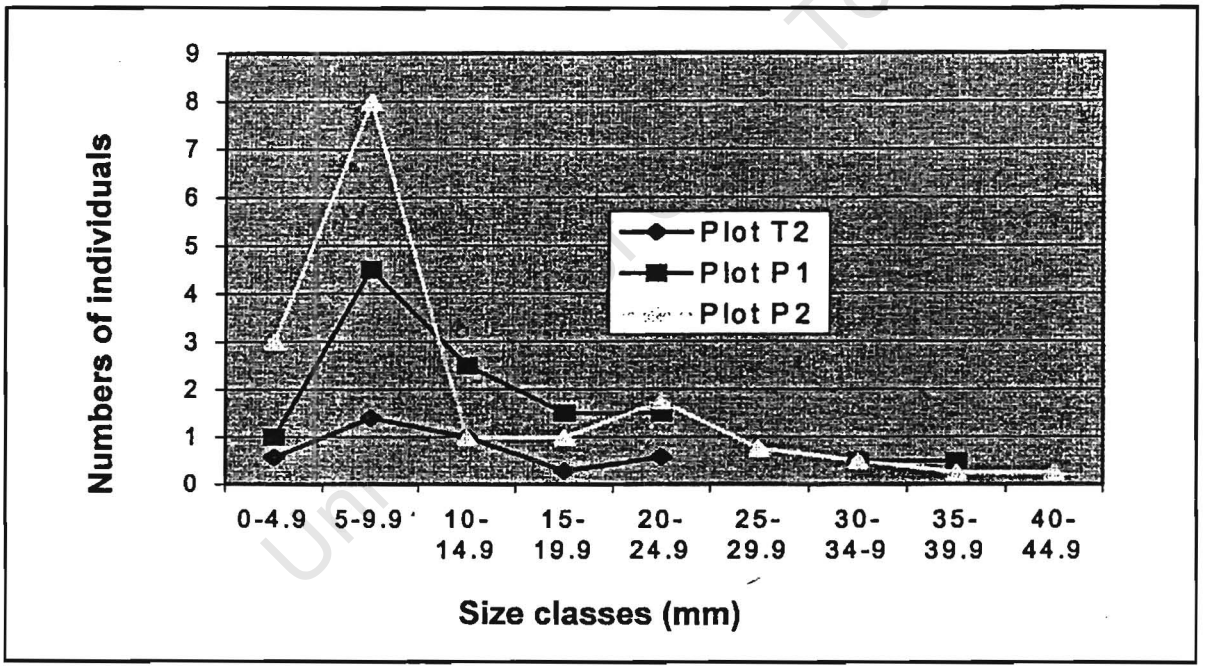


Figure 15 Size class distributions for *L. apocynoides* from 3x100^2 plots, Mururara Hill

The diameter (dbh) measurements recorded were placed in 5mm size class distributions for the different plots. Due to the patchy nature of plant distribution in the plots, sub-samples of the small size classes within the Makweshera plots may not be representative. As all stems over 10mm dbh were measured the results are representative for these size classes. The size-class distributions showed large numbers of small stems and very few large stems.

Ranges in sizes were 1.8mm - 44.4mm. The small number in the range 0-4.9mm was not due to the lack of recruitment but due to the growth pattern, the stolon very quickly becoming this thick. Selection of 10mm size class shows an exponential decay curve. The largest size - 44.3mm only two stem >4.0mm recorded. One in the forest and one from a harvested piece in the village.

Harvesting

Harvesting was recorded from one plot at Mururara and both the Makweshera plots. No harvesting was recorded on Kasinga Hill despite this area being closer to the parish than

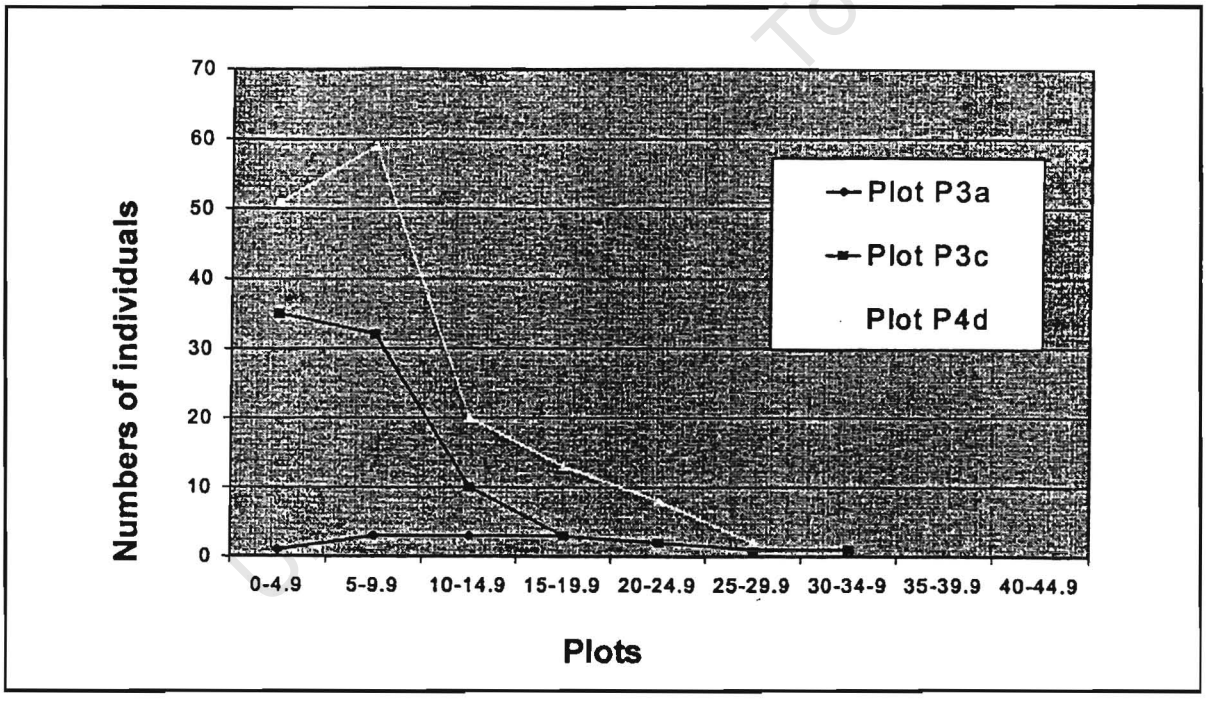


Figure 16 Bar Chart showing individual stems by size classes and those stems cut

some of the other sites. The reason for this was likely to be the few stems, all of a small size, it not being worthwhile harvesters stopping to search in this area. Fourteen cut stems were encountered, representing an average of 117 cut stems/ha (range 50 -175/ha) for the plots. It was observed in a number of cases that the harvesters were not able to pull the liane from the canopy necessitating them to cut the stem at about 3m, leaving 15-20m of stem hanging wasted. 11 of the 14 cut stems recorded were greater than 25mm dbh. The

three smaller stems ranged from 15.2-22.6mm dbh and were close to a saw pit and were probably cut to bind the sawing platform. Of the stems larger than 30mm dbh recorded (n=9) only one was of harvestable quality (being hidden against a tree trunk in an unharvested plot), the others were either of poor quality (branched or twisted)(2), dead (2) or already cut (4). Therefore very few are available for harvesting or of harvestable quality

Plant response to utilisation

Sprouting occurred from cut stems. The plots where the species was more abundant, had large numbers of young stems, some vigorously growing. Harvesting does not appear to threaten the plant as the unharvested size classes (10-25mm dbh) reach the canopy although the ability of these immature stems to flower or indeed the dependence of the species on flowering is not known. Being a long-lived canopy species showing significant ability for vegetative growth it may not need to flower often.

Recruitment and yield

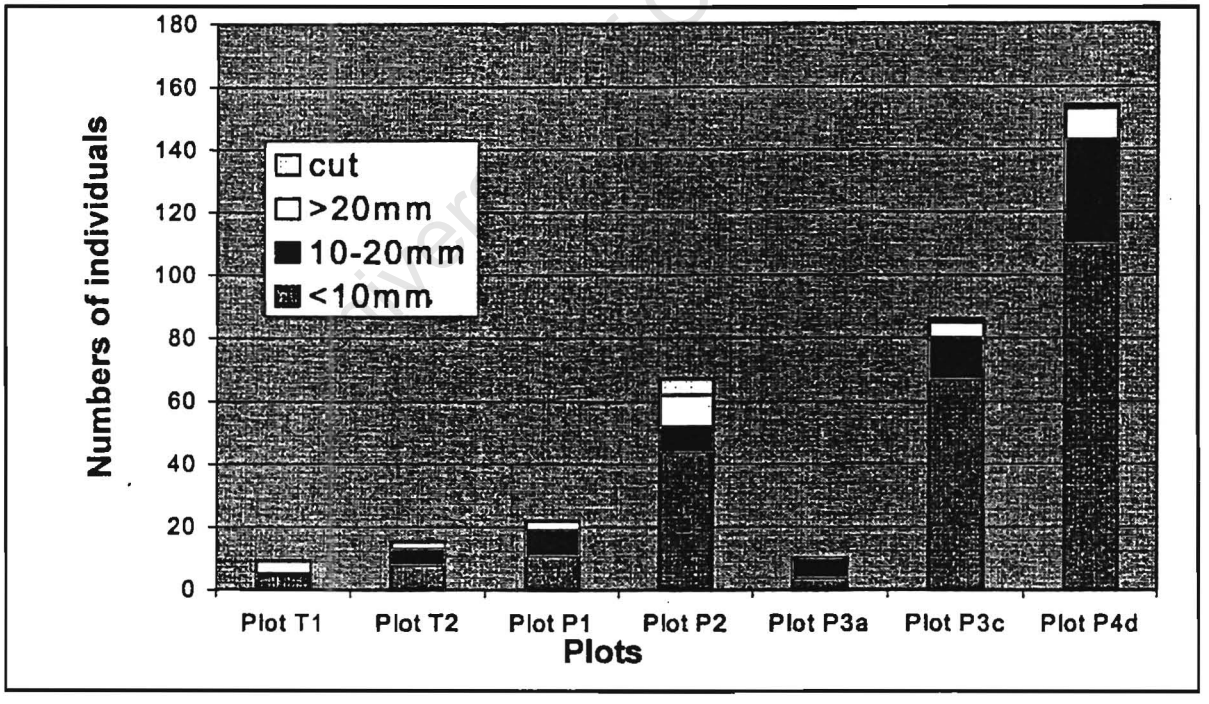


Figure 17 Bar Chart showing individual stems by size classes and those stems cut

Recruitment into the 20.0- 29.9mm dbh size class, the class from which harvesting started, was calculated by averaging the numbers of stems in this size class for all six plots, and then dividing by the estimated number of years it takes a stem to reach this size class

(based on user estimates). The result was 18 stems/ha/yr (see also Figures 16 & 17). Also based on user information it is estimated there is about 5ha of reasonable quality *L. apocynoides* available for the Mpungu parish. Meaning a total yield of 90 stems (>20mm dbh) per year for use by the Mpungu community.

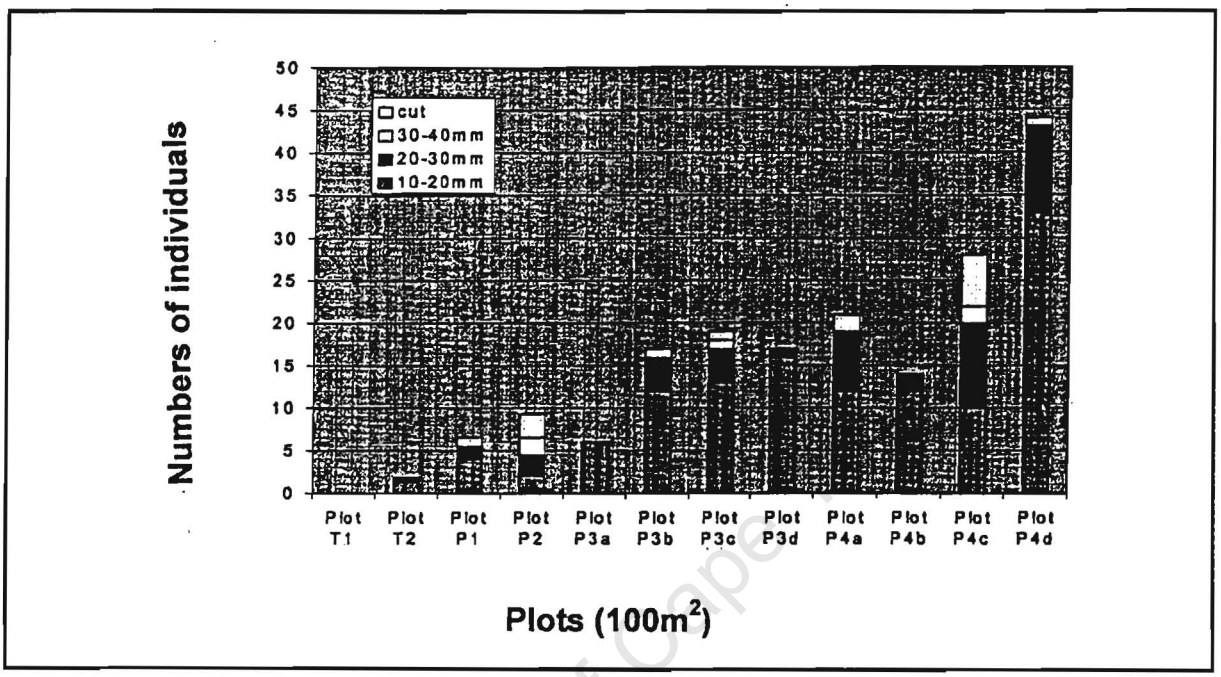


Figure 18 Number of stems per 100m^2 of *L. apocynoides* for all plots

User information

To compare user information with that collected by direct measurement, the user defined information is summarised below.

Demand:	Very high particularly where tea is grown.
Abundance:	Rare.
Growth rate:	Very slow..
Best area in the NP:	Makweshera.
Replacement time:	10-15 (20)yr.
Longevity Granaries:	12yrs.
Stems harvested:	4-7kgs depending on length.
Stems harvested:	4-24m depending if it can be pulled free from canopy.
Length stem/granaries:	15m of stem of >40 mm dbh .
Reasons used:	Resistant to decay and borer attack.

Supply trend: Larger sizes have not been available for the last 10yrs.

Largest size harvested: 65mm dbh.

Conversion

To calculate the length of stems used for different products and to link these with the numbers of stems in the forest plots conversion factors were calculated. An understanding of the processing of the stems is necessary for these conversion factors. The woody stems of *L. apocynoides* have distinct radial rays numbering up to 30. The basket maker twists the stems and splits them long the rays, The radial pieces are separated and split further, using a mohororo (bean hook), to make weft pieces appropriate for the item to be made. Prior to splitting the bark is shaved off the stem. Weft pieces were obtained from short lengths of *L.apocynoides*, which were split by one of the users. These were measured to derive weft width and number calculations in relation to patent stem material. The weight conversion factor was calculated from a single stem of diameter 4.0cm.

Supply, demand and harvesting:

From this survey supply was calculated to be 90 stems (8m x 20mm dbh)/yr, and demand at 556 stems (8m x 30mm dbh)/yr. Further, stems of 30 - 40mm dbh were preferred by basket makers and material derived from these size were measured in products, but stems of 30mm dbh were hardly encountered within the plots, therefore there was virtually nothing left to harvest in the forest. The survey might have, however, missed some better areas within the sites with more mature stems unharvested. The survey confirmed that the community were continuing to harvest *L. apocynoides* despite this not being permitted by the park authorities. The locations for the species are relatively deep within the forest, in the high protection zone. One of the options for management could be to accept the current low level theft, which would be very difficult to prevent, would cause no short to medium term harm to the species (depending on its need to flower). However, it would also be possible to allow the use of *Loeseneriella apocynoides* for stretcher making as the requirement for these is well below the supply as calculated. This would also strengthen the bond with the stretcher societies that form the core of the Forest Societies who are managing the multiple-use activity. Harvesting for stretchers, it is recommended, would be

carried out on one day a year and be accompanied by the park rangers and therefore have minimal impact on the High Protection Zone.

Evaluation of user information

Makweshera was the best of the sites recorded, but it was not possible to confirm whether it was the best area in the forest. The survey was dependent on the local knowledge of the sites, without that we would have been wandering around the forest for days looking for the plant! The high demand and low supply/rarity was confirmed. Most of the information regarding length of time for regrowth to harvestable size could not be confirmed in a short survey. And in fact many of the assumptions for the calculations, i.e. growth/replacement rates and longevity of products was still based on user information. Some information gathered from areas outside Mpungu was proven to be inaccurate. This was considered due to the suspicion and possibly poor selection of informants. For example on a previous survey to see *L.apocynoides* in the Buhoma area of the forest, our guide who we suspected of deliberately taking us to an area poor in the species, was arrested a few days later carrying a headload of vines from this species out of the forest! Even in Mpungu, the presence of the well-respected RCII chairman was essential on the survey team, to allay the fears of farmers being interviewed. One of the specific pieces of information from Mpungu that was checked was the material needed for a granary. The informant said 5 stems of 3m long (15m) of diameter 43.5mm. A calculation for an average granary at this diameter was 13.2m, which was very close to the user estimate.

Further Surveys

These brief surveys on supply and demand of *Loeseneriella apocynoides*, broadly confirmed the results of the initial rapid vulnerability assessment and added to the confidence that the decisions taken not to use this species was correct. Harvesting of a small number of stems per year for stretchers could be a small modification of this basic policy. The permanent plots established should be resurveyed on an annual basis as part of the multiple-use monitoring programme. It would be desirable to measure the areas of the whole patches containing *Loeseneriella apocynoides* (Omujega), and to strengthen some of

the assumptions made. A more detailed survey of this species was later carried out and compared in section 4.1.2.2, Table 25.

Alternatives

The calculations of demand are based on only using *Loeseneriella apocynoides* for these products. Even in 1994 at the time of the fieldwork, however, this was not the case and that other species were being used for these products. Most of the other species are, however, considered by basket makers to be of lower quality. Increased efforts to promote these other species as substitutes for *Loeseneriella apocynoides* would reduce some of the pressure on this species. This would, however, require carrying out similar assessments on those other species or placing more focus on on-farm cultivation of, for example bamboo.

3.2.2.2 Case Study 2: Smilax anceps

The study site for this species was Kitojo Parish.

Product descriptions

Smilax anceps (enshuri) was used for many products (Photo 14). Like *Loeseneriella apocynoides* (Omujega), it was used for tea plucking baskets, granaries, stretchers and pot baskets. In addition it was used for agricultural food baskets, winnowing trays, and number of small items such as woven straining spoons and bindings for the handles of tools. The agricultural food baskets were particularly important. These were used for harvesting in the fields, storing in the home or carrying to market. The vast majority of food produced in Kigezi is carried at least once and often many times in these baskets. The baskets made from *S. anceps* were prized over the ones made from bamboo, as they last up to five times longer (5 years).

Harvesting method

Harvesting of *S. anceps* is carried out by the basket makers themselves. Stolons and stems are harvested, stolons are preferred. The harvester locates a stolon and traces it back to the parent root stock where it is cut. It is then pulled from the leaf litter where it is often

buried. Harvested stolons which are usually about 5mm in diameter, can be as long as 17m. Once harvested the stolons are wound up into a bundle about 1.5m long and carried home on the head (Photo 10) to be processed later. Some times a few stems will also be harvested, these tend to have a smaller diameter are shorter and are less flexible. They are used for basket uprights.

Demand

Kitojo Parish has 1,217 households. To calculate the demand for the Kitojo Parish the following assumptions were made based information gained from interviewing the expert resource users.

1. Each household has two agricultural baskets and one winnowing tray.
2. That these items are of average dimensions, 1 and 1.5kgs respectively.
3. Each item lasts three years.

Based on these figures, the annual demand from the 1,217 households is 1.16kg/yr for each household and a total of 1,419kg/yr for the whole parish.

Supply

Nineteen patches of *S. anceps* were described by the resource users, of these six were measured and harvesting plots established within them. The patches ranged in size from 1,675m^2 to 41,250m^2 with an average size of 11,228m^2. The total area of the patches of *S. anceps* accessible to Kitojo harvesters was therefore 213,332m^2 (21.3ha). The 12 100m^2 harvesting plots yielded quantities of materials presented in Table 15, adjusted to a per hectare figure.

	NUMBERS HARVESTED (n/ha)	MEAN LENGTH (cm)	TOTAL LENGTH (cm/ha)	RANGE OF LENGTHS (cm)	TOTAL WEIGHT (kg/ha)
Stolons	575	579	3,248	200-1,710	102
Stems	717	141	1,413	70-326	41
Total	1,292	720	4,661	200-1,710	144

Table 15 Quantities of stems and stolons of Smilax anceps, harvested per hectare, based on 12, 100m^2 plots.

Parts used

As previously mentioned both stolons and stems were harvested, stems, however, were less preferred to stolons, and harvesters we spoke to from other parts of the forest only used the stolons. Further, it is likely that the large numbers of stems collected in the trial harvesting was in part a factor of the trial itself, the harvesters thinking that was what we wanted. As the trial harvesting continued the numbers of stems they harvested declined. Under normal harvesting few if any stems would therefore be harvested. The harvesting of predominantly stolons therefore had a minimal effect on the short term functioning of the individual plant. It could be argued that in the long term repeated stolon removal could limit the dispersal and regeneration of the plant. This is, however, considered unlikely too happen in this case due to a) the stability of the patches (see below) b) the abundant fruiting seen in other parts of the forest and c) the abundance of the species throughout the forest. In addition harvesters mentioned that harvesting often stimulated vigorous regrowth.

Biomass

Working with harvesters in the field indicated that harvesting removed only a small amount of the total biomass of the species. It was often hard to visually see where the harvesters had been harvesting, and it is highly unlikely that ecological measures of frequency or cover, would have detected differences in plots, prior to and after harvesting. To examine what proportion of total biomass of the species was removed during harvesting all parts of S. *anceps* were removed from a single $25m^2$ sub-plot taken from one of the $100m^2$ plots, this yielded 62kgs of plant material. Of this 2kgs were roots tubers and underground parts. 60kgs were stems, leaves and dead material. While it is not valid to extrapolate from a single plot to the real situation, this sub-plot would indicate that the parts harvested are likely to amount to less than one percent of the total plant material of the species.

Patch longevity/stability

Many of the patches in the Kitojo area were apparently stable. The harvesters claimed to have learnt about them from their grandfathers. The patches were well known, the *S. anceps* in each one having specific qualities and some patches had names. This stability of

the patches and the fact that, even under poorly regulated harvesting regimes, harvesters had not observed declines, indicates the low vulnerability to harvesting of this species.

Conversion

As with *Loeseneriella apocynoides* processing of the material takes place. Firstly the bark was removed. This was done by tying the stolon to a tree or pole at 1.5m from the ground. Starting from the furthest end and pulling the material taught the bark and thorns were scraped off using a local bean hook. Subsequently the stolons were split in half. The stems, which were used for the basket uprights, were kept whole. 7,145 gm of material was processed in this way and made into one basket and one winnowing tray. The basket weighed 980gm while the tray weighed 1,560gm. 4,370gm of waste material (thorns, bark and scraps) remained. 235 gm were unaccounted for either due to drying or lost scraps. Only 35% of the harvested material ended up in the final product.

Germination and Growth trials

Transplanting of rootstocks

Clumps of *S. anceps* were dug up from the forest. The tangled mass of roots and tubers were split up. Eight rootstocks were transplanted. Sprouting occurred at between 45 and 91 days after planting. The number of tubers per plant affected the degree of sprouting, with plants with more than four tubers growing better.

NUMBER OF PLANTS	NUMBER OF TUBERS	COMMENTS
5	1-2	died, minimal growth or late sprouting (> 91 days)
3	3-5	vigorous growth, early sprouting (45 - 70 days)

Table 16 Propagation of *S. anceps* from rootstocks.

Seed propagation

Seed was collected from two sources on 13/3/93.

1. Collected from *S. anceps* liane c. 4m from ground level.

2. Collected from gorilla dung.

Observations were made from these two collections as follows.

Fruits and seeds from the liane. Fruit were collected directly from the liane. The fruits were borne on clusters, which had on average 20 (n=7, range 8-24) fruits per cluster. The fruits were approximately 10mm in diameter, oval to round and slightly flattened longitudinally, also slightly pointed at the tip and flattened at the base. At first the fruit were green, then tingeing pink, becoming red before ripening to reddish purple. The fruit contents were a sticky mucus in the unripe fruit, ripening to a red dryish pulp. From a sample of 222 fruit of *S. anceps*, it was determined fruit had one, two or three seeds per fruit. These were in the proportion, 14.7% fruit had one seed, 44.1% had two seeds and 41.2% had three seeds. The average seed per fruit was 2.26.

The seeds were oval to round slightly flattened longitudinally. Occasionally the seeds were flattened on one side when grown against another seed. The seeds were hard with a shiny and finely textured coat. They were transparent to white ripening through golden red brown, to chestnut, to very dark brown. They ranged on size from 2-5mm at the widest point while the majority were 3-4 mm.

Gorilla dung. During fieldwork, gorilla dung was encountered containing many seeds of *S. anceps*. Two separate gorilla stools (approximately cylindrical, 4cm diameter and 10cm long) were collected on 13/3/93 one deposited under a fruiting *S. anceps* on 12/3/93 the other deposited on rank vegetation on the 13/3/93. The two stools were combined and the seeds were separated out. There were 1,649 seeds contained in the combined stools giving an average of 326 fruit per stool, based on an average of 2.26 seeds per fruit (see above). It was estimated that *S. anceps* constituted 70-80% of the faecal remains. The majority of the fruit (85%) were partially or completely digested.

Status of fruit in gorilla stools	Fruit digested (seeds unassociated with fruit)	Fruit partially digested (fruit coat broken and pulp partially removed)	Fruit undigested (fruit coat complete)	Total
Number of seeds	953	456	240	1649
Percentage of seeds	57%	28%	15%	100%

Table 17 Number of seeds extracted from two gorilla stools.

Germination

Seeds were sown, either onto a fine soil seedbed, or into a potting mix including soil, sand and compost. Half the seeds on the soil seedbed were mulched with leaf litter. All plants were sheltered from direct sun and rain by a seedbed shade.

SEED BED	FINE SOIL				POTTING MIX	
No/Mulch	Mulch		No Mulch		No mulch	
Pre-treatment	Dung	Fruit	Dung	Fruit	Dung	Fruit
No.seeds	100	100	100	100	200	200
Germination at 103 days	28	2	5	0	0	0
Germination at 126 days	60	19	55	9	7	2

Table 18 Germination of *S. anceps* seeds under different treatments

The observations from these informal trials were that

1. Passing through gorilla intestine assisted to break dormancy, 57.5% of seeds from dung had germinated and only 14.0% of seeds directly from fruit had germinated after 126 days (soil treatment).

2. A leaf mulch helped to speed up germination with 15.0% of the mulched seeds germinating after 103 days contrasting with only 2.5% of the unmulched seeds. By day

126 the unmulched seeds had narrowed the gap and the figures for mulched and unmulched were 39.5% and 32.0% respectively.

3. The potting mix used was not suitable for germinating these seeds, most likely because of the quality of the sand. As a result 35.7% of seeds on soil and only 2.2% of seed on the mix had germinated after 126 days.

Cuttings and Stolons

Stem cuttings 20cm in length were taken and set in a prepared bed, none sprouted after several months. 5 stolons of various lengths (between 14-31 nodes) were pegged into a shallow drill and covered with soil. The nursery site was shaded and the stolons were mulched, and two were treated with hormone rooting powder. After several months only one node of one stolon sprouted a shoot, which was then subsequently eaten, most likely by a duiker.

Growth trials

A small number (4) of the plants that had been planted into potential niches within the agricultural landscape, grew enough to make some observation on their growth. These were; one in a hedgerow of *Erythrina abyssinica*, two within eucalyptus (*Eucalyptus sp.*) plantation and one within a black wattle (*Acacia mearnsii*) plantation. At their best performance individual shoots grew quite fast, one adding a metre in length in less than 100 days (Figure 19). As a whole however, the new plants did not do very well. The three within the plantations died during the dry season when the plantations soils became very dry. The plant in the hedgerow grew for considerably longer. However this plant, which was observed for over a year, showed no indication of sending out stolons. One would presume that sufficient canopy leaf surface and root biomass would need to be developed before the stolons would be sent out. It could take several years in a favourable setting for transplanted plants to reach that stage. Should however, a plant reach that stage there would be few places for the stolons to go and therefore develop into useful runners for basket makers. The plantations would provide the most suitable ground conditions for stolon development. One basket maker (John Batanyenda, from Ruhija) was claiming at least the early stages of success in growing *Smilax anceps*. He had transplanted a large

clump into some fallow land next to a plantation and reported it growing well. This would provide suitable growing conditions with the space for stolons to develop into the plantation. Success may be limited by access by livestock.

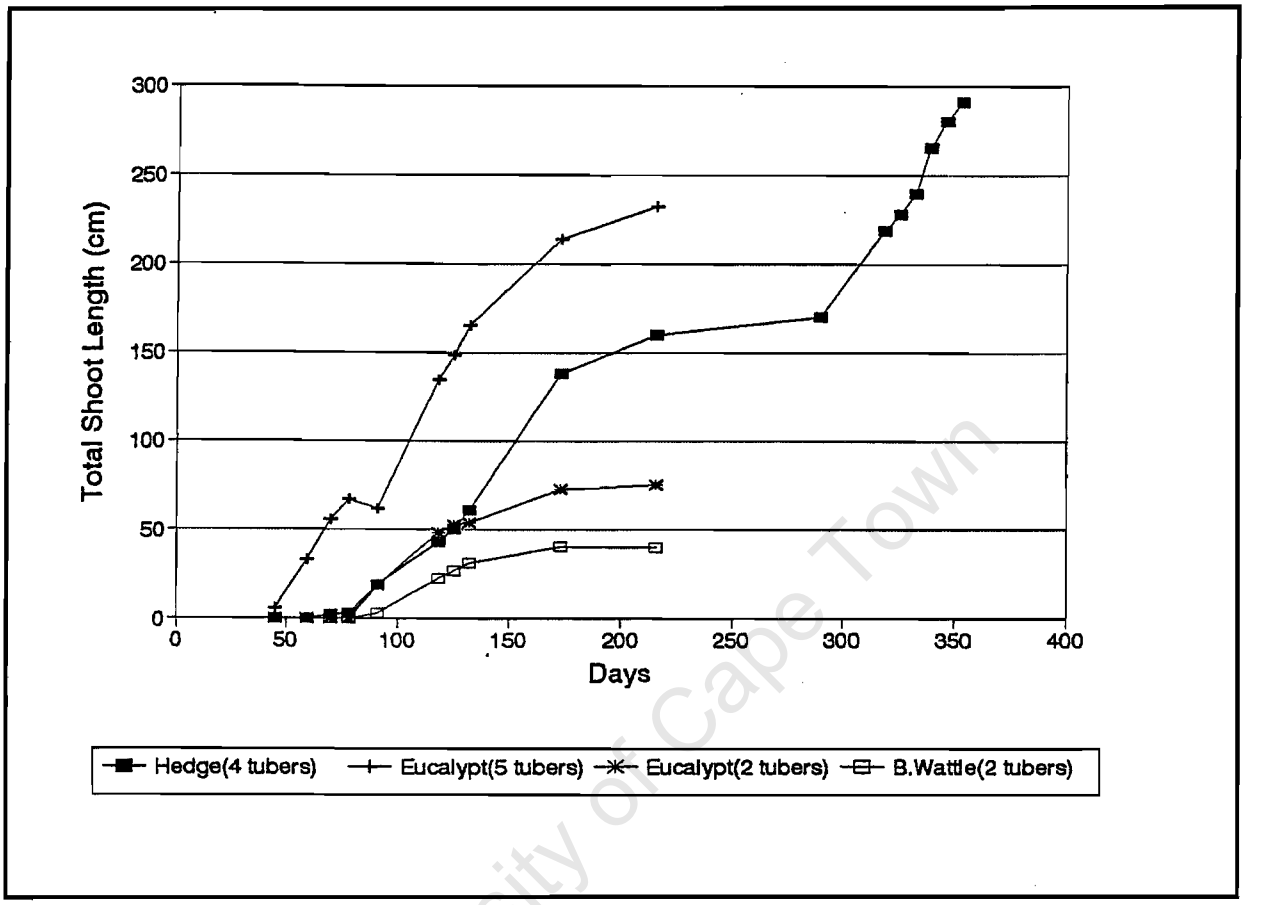


Figure 19 Growth of four *S. anceps* plants in different farm niches

Discussion

Smilax anceps from the forest:

Using the figure of 144 kg/ha of harvested material derived from the harvesting plots, the 21.3ha of *S. anceps* area available to Kitojo harvesters, would yield a total of 3,067kg. I did not get an estimate from the users as to the recovery time required to wait between harvesting a particular patch, but given the growth of 3m/yr derived from the growth observations (below), a harvest every two years could be expected. If this is the case, and given that only 35% of the harvests ends up as product, the annual production from the area

would be 537kg. This contrasts with an estimated annual demand of 1,419kg for the parish. The forest therefore would be able to supply 38% of the demand.

These figures are only provisional and there are a number of factors that will modify them:

1. Kitojo Parish is adjacent to the main bamboo area of the forest, many families use bamboo rather than *S. anceps* for household products. Demand is likely, therefore, to be significantly lower than calculated, or at least an acceptable substitute is available. A later survey showed, for example, that of 115 granaries sampled in Kitojo Parish, 84.3% were from *Sinarundinaria alpina* (Muhwezi, 1997).

2. The calculations of demand did not include some of the minor uses of *S. anceps*, stretchers and pot covers for example, these would marginally increase demand over that calculated.

3. The study area is at an altitude of 2,300m, and is the highest area of the forest supporting *Smilax anceps*, which is probably close to its altitudinal limit. Work in other areas of the forest indicated that the liane was more productive at lower altitudes. As many of the other patches described by the basket makers were at lower altitudes the patch size and the total production may be larger than in the high altitude study site. Supply may, therefore, be underestimated.

4. Three years basket longevity is a conservative estimate and demand may actually be lower than calculated.

5. It may be however that the patches described by the users may be used by other parishes as well as Kitojo, increasing the demand placed on them. Conversely some of the patches may fall within the high protection zones under the management plan and not be accessible to harvesters.

6. The expert basket makers seemed to harvest more stems than they would have done under normal circumstances in the apparent belief that this is what we researchers wanted. As stems are a less useful product this factor could have inflated the per hectare production figure.

Despite these other factors the study area indicated that *S. anceps* could produce substantial amounts of basketry material, and that there was little to no danger of population being reduced because of harvesting, with only a small amount of total being removed during any single harvesting event. Later, during the first sanctioned harvesting of this species at Ntendure Hill multiple-use area, Mpungu Parish, 11 users collected 38.4kg of *S. anceps* stolons. This represents only 0.13kg/ha removal assuming only half the multiple-use area (300ha) has harvestable *S. anceps*. This contrasts with the 102 kg/ha of stolons calculated from the Kitojo area plots. It is a further indication that the sustainability of harvesting under the proposed system.

The fact that gorillas consume *S. anceps* fruit and people harvest stolons from the same species is significant. While no direct competition for the resource is likely, there could be the incidence of physical proximity of harvesters to gorillas. A provision for this was included in the memorandum of understanding, see section 3.2.4 requiring that no harvesting take place when a group of gorillas are present within a multiple-use area.

Smilax anceps *grown on farm*

Methods of propagation were identified and transplanting clumps of rootstock were the most effective. Due to the intensive use of the surrounding agricultural land there would appear few appropriate niches for *S. anceps* for cultivation in the agricultural landscape given its requirements for stolon development. Where planting of *S. anceps* is tried, production is likely to be reduced by livestock and theft. As harvesting from within the forest is practical there is no need to further pursue on farm cultivation of this species.

3.2.2.3 Case Study 3: Tea Plucking Baskets, Results

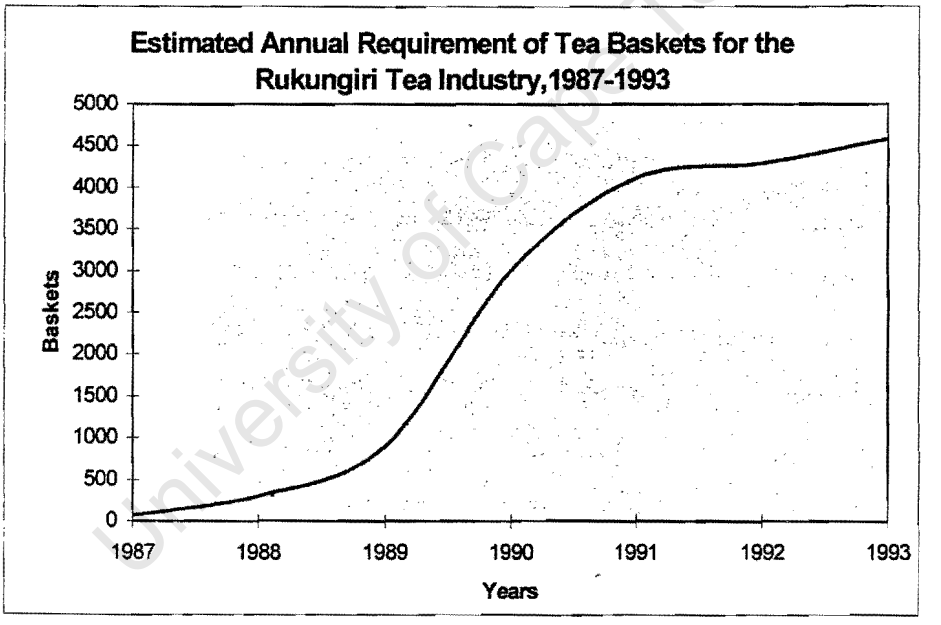
Rehabilitation And Growth Of The Tea Industry

The rehabilitation of tea growing in Rukungiri District started with the rehabilitation of the Kayonza Tea Factory in 1987. In 1988 the rehabilitation of the tea itself started. The area of tea under production has risen dramatically from 80 hectares in 1988 to 1,212 hectares in 1993. The 1993 production of green leaf tea was almost 5 million kilograms. The industry was planning to increase in this production. All the tea produced is carried at least once and

often twice in tea plucking baskets emphasising the importance of this product to the industry.

Demand for Tea Plucking Baskets

The area under tea in 1993 was 1,212 ha. From our investigations the average number of baskets used by pickers, at that time was 4.78/ha. According to information from tea growers, even the durable baskets were not lasting for much over one year. This was due to the rough treatment that baskets were receiving, largely due to having to use them to carry tea from their farms to the collection/weighing stations. Taking an average basket life of one year the requirement for the Kayonza industry is over 4,500 plucking baskets annually.



Shortage of Baskets

Due to this massive increase in the demand for baskets supply could not meet demand. Out growers were complaining of a shortage of plucking baskets. Many did not have enough for efficient harvesting and there were reports of even saucepans being used for plucking (Cunningham 1992). Nylon gunny bags and even kitenges (women's wrap arounds) were

being used to transport tea to collection centres, with some problems of premature fermentation and loss of quality.

Handling of Baskets

Plucking baskets were being also used for carrying tea to, and weighing at, collection points. This was shortening their life span and increasing the demand for baskets. Nets are normally used in these situations, often provided by the tea company.

Species and Sources of Basket Materials

Tea baskets are made from a range of plant species (Table 19). These came mostly, and in some cases exclusively, from the Bwindi Impenetrable National Park. The use of the different species varied around the park depending on the availability of the most favoured species.

***Loeseneriella apocynoides* (Omujega).** *Loeseneriella apocynoides* (Omujega) was the most popular species for tea baskets as it was the most long lasting. In the survey of baskets at a collection centre in Mpungu Parish, all were made of *L. apocynoides* and most were less than two years old. It was the rarest of the species used for baskets and found only in restricted sites, deep within the National Park (see case study 1 section, 3.2.2.1). Despite the forest being closed to harvesting of this species since 1991, illegal harvesting still continued either by the basket makers themselves or others collecting for them. Delivery of the vines went on at night. Park staff and local resource users reported that there were no longer any vines of harvestable size remaining in the Northern Sector of the forest. Monitoring plots were established in the remaining patches in the Southern Sector. These areas were far from the forest edge but had very few mature and useable vines. *L. apocynoides* experts reported a decline in the availability of the species over the eight years to 1993. Estimates of the growth of vines to harvestable size were from 10-15 (20) years.

Botanical Name	Rukiga Name	Family	Life form	Part Used	Basket Life Span	Abundance	
						Forest	Farm
Loeseneriella apocynoides	Omujega	Celastraceae	Climber	Stem	1-5yrs	R	-
Smilax anceps	Enshuri	Smilacaceae	Climber	Stolon	1-2yrs	F	R
Raphia farinifera	Ekihungye	Arecaceae	Palm	Leaf midrib	0.5-1yr	O-R	O-R
Dodonaea viscosa	Omushambya	Sapindaceae	Shrub	Stem	1-3yrs	R	O
Unident.	Ekihuta	Unident.	?	?	?	-	?

Table 19 Species used for tea plucking baskets for the Rukungiri tea industry

***Smilax anceps* (Enshuri).** *Smilax anceps* is widespread within the forest, and harvesting was allowed by Uganda National Parks in demarcated zones within Bwindi Impenetrable National Park (see Case Study 2). To a certain extent it could be a substitute for *L. apocynoides*, but it was preferred for other products needed by the community (winnowing trays, stretchers, agricultural baskets). The programme allowing the harvesting of *Smilax anceps* was in a 3 parish pilot phase, and was not expanded to other areas for over five years and therefore did not help to provide tea baskets. It occurred very rarely in fallow land and forest fragments outside Bwindi but in such small quantities as to be functionally absent. This species was not, therefore, a good substitute tea basket.

Raphia farinifera (Ekihungye). The midribs of the leaves of *Raphia farinifera*, the raffia palm are also used for the production of tea baskets. This species was found in small numbers both inside and outside the park along river valleys. It is theoretically possible to harvest this sustainable from the park but Uganda National Parks had not made a decision regarding this.

***Dodonaea viscosa* (Omushambya).** *Dodonaea viscosa* is a pioneer shrub and occurred commonly on fallow and grazing land outside the park. It was not traditionally used for the production of tea baskets, but for items such as beehives. Some tea farmers were starting to use it for the smallest of a pair of plucking baskets. It can last two to three years if well looked after. The National Agricultural Research Organisation (NARO) and the International Council for Research into Agroforestry (ICRAF) were, at the time, carrying

out trials with *Dodonaea viscosa* at Katchwekano DFI, Kabale. They examined the soil conservation potential of the species, particularly for bund stabilisation.

Ekihuta. Little was discover regarding Ekihuta. It was seen sold on Butogota market, and was reported to be a climber species growing along river valleys in savannah areas. It probably comes from the lower altitude Kihiihi area, which is mostly *Acacia* woodland.

Recommendations[12]

Both the Tea Industry and National Parks based Tourism are key contributors to the Uganda Governments plans for economic development. The tea industry is important as it provided an alternative income to park exploitation. Both were supported with funds from the European Union. It was recommended that Uganda National Parks request that The Uganda Tea Growers Corporation supplies alternative baskets to tea growers as well as both parties carry out the measures below to improve alternative basket supply.

The Uganda Tea Growers Corporation (UTGC) could play a considerable role in the resolution of this situation. From discussions with staff at the Tea Factory, we understand the industry does supply alternative baskets. Options could be:

a) Plastic plucking baskets supplied on credit as other inputs, i.e. capes, fertilisers etc.

b) On-farm planting of basketry species extended through the tea extension service. Species could include; palms *Raphia farinifera*, *Phoenix reclinata*, or bamboo - *Sinarundinaria alpina*, *Bambusa sp.*

c) Provision of nets for the carrying and weighing of tea.

d) Promotion of the use of *Dodonaea viscosa* for small plucking baskets, and possibly for soil conservation.

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[12] Most of this case study was produced in a report for Uganda National Parks (Wild, 1994).

Short-term recommendations

- Providing plastic baskets to small holders.
- Providing nets for transportation and weighing.
- Promoting the use of *Dodonaea viscosa.*
- Discouraging the use of *Loeseneriella apocynoides*.

Long-term recommendations

- Provide planting material of Bamboo species through the UTGC extension service.
- Support research into the farm production.

Multiple-Use Species Summary Forms

One major output of the case studies was an updated Bwindi Multiple-use Programme Species Summary Form. The forms summarised the biological and social information of each species. A summary form was produced for each species that was considered for use after the rapid vulnerability assessment. At this point the biological data collected was based on general life form characteristics and user and multiple-use team estimates of abundance and distribution. The case studies added preliminary plot based ecological data, with relatively little time investment and therefore added important ecological information to increase the accuracy of the decision making process. The Demanded Species Information Form, documented the decision making process for each species. These summary forms produced in 1994 for *L. apocynoides* and *S. anceps* are presented below.

BWINDI IMPENETRABLE NATIONAL PARK

***Loesneriella apocynoides* - DEMANDED SPECIES INFORMATION FORM**

DATA BASE CODE: LOE APP FAMILY:CELASTRACEAE

BOTANICAL NAME: *Loeseneriella apocynoides* (Oliv.) J.Raynal[1]

From the Flora of Tropical East Africa, two varieties occur, both of which have been collected in Uganda. The two varieties differ based on fertile material and no flowering was seen in Bwindi Forest. From the distribution of collected specimens one might assume var. *apocynoides,* would occur at Bwindi Forest (U2) as this variety was collected from Western Uganda (U2), while var. *guineensis* was collected from south-central Uganda (U4). The altitude distribution at Bwindi of 1560m-1920m, however, fits better with var. *guineensis*, as the recorded U4 specimens were collected from an altitude range of 1150m - 2135m, as opposed to an altitude range of close to sea level to 1740m for var. *apocynoides.* The altitudinal overlap of the species could mean both varieties may occur, although this is probably unlikely. The determination of the variety present in Bwindi Forest will have to await the collection of fertile material.

SYNONYMS:

From the Flora of Tropical East Africa[1]: Synonyms of *Loeseneriella apocynoides* var. *apocynoides* = *Hippocratea apocynoides* Oliv. and *[Loeseneriella guineensis* sensu R,Wilczeck].

Synonyms of *L. apocynoides* var. *guineensis* = *Hippocratea guineensis* Hutch. & M.B. Moss, *Loeseneriella guineensis* (Hutch. & M.B. Moss)and *Hippocratea apocynoides* Oliv. subsp. *guineensis*.

LOCAL NAMES: BINP, Omujega (singular), Emijega (plural). Rwanda, Omutomera.

LIFE FORM: Liane

DISTRIBUTION: (BINP, Uganda, Africa)

AFRICA[1]: var. apocynoides: Uganda Ankole District (U2): Buhjewu and Rugongo. Tanzania: Buha District, Uzaramo District (Pugu & Banda Forest Reserves), T4,.6,8; Zaire, Rwanda and Angola.

var. guineensis; Uganda; Masaka District; Malabigambo Forest, Mengo District; Sizibwa Falls. W. tropical Africa, Cameroon, Central African Republic, Zaire (now Democratic Republic of Congo) and Zambia.

Rwanda, montane forests 1400-1800m in Cyangugu and Kigali prefectures[2].

BINP: Altitude : Restricted to the lower to mid altitude areas 1560m-1920m. Not Known from Ruhija area (altitude 2,300m).Known from the following hills;

Mururara, alt. 1900m (Mpungu)

Makweshera, alt. 1920m (Mpungu).

Katendegyere, (Mukono, Nteko)

Kanyangwe, alt. 1560m (Mukono)

Near Mubwindi Swamp Rubuguri side. Distribution very patchy, even at a small scale

ABUNDANCE: Rare.

HABITAT REQUIREMENTS:

FTEA: Habitat: Var. *apocynoides*; damp forests, secondary thickets; up to 1740m. Var. *guineensis*; Damp forest; 1150-2135m.

BINP: User information: Good canopy, little undergrowth, sometimes rocky areas, on hillsides and valleys, but not where too much undergrowth. Prefer moist sites. Not dry, but not water logged. The multiple use team observations: best sites are bottom to mid slopes with poor growth on ridges, sometimes on the edge of open valleys with *Cyathea – Neoboutonia - Brilliantaisia* dominated vegetation.

OCCURRENCE IN SUSTAINABLE DEVELOPMENT AREA:

None.

GROWTH RATE:

Very slow, User estimates are (10-15(20)) years to replace a cut stem. Monitoring plots have been established to measure growth rates.

REPRODUCTIVE ABILITY:

Reproduces well vegetatively. Cut stems produce many new stems. Stems will root in the soil. Sexual reproduction is unknown in BINP. No flowering has been recorded in BINP (or exhaustively looked for)

PERSISTENCE:

Harvesting does not kill the plant. It can regrow from cut stems. Mid size stems (10-20mm dbh) are not harvested. These are in the canopy, and can support regrowth. Plots on Mururara and particularly Makweshera had large numbers of small stems.

USES:

Tea Plucking baskets, Granaries, Stretchers, Pot baskets

PARTS USED:

Stem. Straight stems above 25 mm dbh are preferred. In the absence of these stems of 20mm and rarely as low as 15mm dbh will be taken. Branched and curved stems are avoided if possible.

DEMAND:

High. In the areas that it occurs it ranks in the top three of forest products. Demand from the Mpungu Parish case study was 556 vines (8m x 30mm dbh).

HARVESTING PATTERNS:

Suitable stems are cut 30-90cms from the ground to allow for sprouting. Several men then pull stems out of the canopy. If the stem will not come out it is cut as high as possible, either by climbing a tree or by reaching up. Vines are cut into 7 ft (2.13m) lengths and folded into two for carrying. If the vine has knots or is curved it is cut into arm lengths.

QUANTITIES HARVESTED AND USED:

1. User estimates: When free from other climbers one plant will yield 6x7ft (12.78m). In competition with other climbers, yield is 1 - 3x7ft (2 -3m)

1 tea basket - 5 arm spans 1x7ft. length. 10.5m

1 stretcher - 8x7ft weft only, 14x7ft whole stretcher. 56m

2. Case study calculations: See section 3.2.2.2

IMPACT OF HARVESTING:

a) On Potential Utilisation species: Harvesting will not cause the species to go extinct in BINP. It has a high degree of persistence as its young stems regrow from the cut stems the plants have underground root networks and also regrow from these. Currently users do not harvest stems below 20mm dbh, leaving many stems in the canopy. Harvesters go to the main sites for the plant leaving the less good areas alone. There is suppression of the larger size classes. this does not impact upon vegetative reproduction but may affect flowering, occurrence of flowering is unrecorded from Bwindi, and the flowering pattern unknown.

b) On Ecosystem: There are no known or obvious relationships with other species. There might conceivably be a mutualistic relationship with a pollinating animal.

NUMBER OF HARVESTERS:

Difficult to estimate, but harvesting seems restricted to a few specialists, probably not more than 100 for the whole forest.

PROCESSING;

Bark is removed from the stems (in the forest if there is time). Stems are split by twisting them, the stem structure having radial lines along which the splitting occurs. Split material can be slit two or three times depending on the product required. The split material is dried for future use. Drying takes a minimum of 3 hours. Whole stems can be stored for long periods before splitting and use. With periods of five years being recorded.

Making times: The Tea baskets 2 full days.

Ebitukuru (Crop Basket) - 12 can be made per month.

Entete (Tea Basket) - 4 per month are difficult and hard to make (probably not full time).

Engozi (stretcher) - 7 days to make including the splitting.

MARKETING:

Usually by order from neighbours. Can take to the market but this is not usually necessary.

Omujega tea basket fetches 2,500-3,000/- (March 1993)

Comparative prices for a crop basket (ebitukuru) from different species are (March 1993):

L.apocynoides -omujega 2500/=

Smilax anceps - enshuri 1500/=

Sinarundinaria alpina-bamboo 600/=

Stretchers from. *L.apocynoides* used to sell for 6,000/- now they are 25,000/= (Mukono, March 1993)

SUBSTITUTION NEED:

There is a great need for substitution. This should be a priority for the tea baskets. The production of alternative baskets could be an income generating activity for some groups. Alternatives do exist and attention needs to be made to developing the most appropriate options and extending this information through the CARE project, Conservation Extension Agents.

POSSIBLE FUTURE TRENDS; (Abundance, demand, harvesting, marketing)

Unless the demand is reduced by the provision of alternatives it is likely that over exploitation will continue. If harvesters resort to the taking of even smaller stems this could more seriously damage the species in future.

INFORMATION LACKING:

The distribution of the species in the forest could be better known. It would be ideal to try and find sites that are not exploited to compare with those that are, and try to find out about flowering and sexual reproduction. An efficient design of grain store that uses alternative materials is also needed.

SUSTAINABILITY ASSESSMENT:

Given current demand and supply continued use is clearly not sustainable. The species could be used but it will require the reduction of demand.

MONITORING METHODS:

Four permanent monitoring plots have been established. These should be regularly re-recorded and the impact of harvesting determined. The level of the harvesting can more easily be determined by on farm observations of tea baskets and new granaries.

COMMENTS:

Farmers still need to pick their tea and store their crops unless alternatives are addressed it is unrealistic to expect that poaching of *L. apocynoides* will stop. The current recommendation from Dr. Cunningham is that there should be a four year halting of *L. apocynoides* harvesting and that after that rotational harvesting should be considered, subject to further research

REFERENCES:

1. Pohill, R.M. (ed). 1994. Flora of Tropical East Africa. Celastraceae, Robinson, N.K.M; Halle, N.; Mathew, B.; V.M.H . and Blakelock R. Balkema, Rotterdam.

2. Troupin et collborateurs. 1983. Flore de Rwanda. Vol. II. Agence de Cooperation culturelle et Technique. Musee Royal de L'Afrique Centrale. Tervan, Belgique.

3. Hutchinson J. and Dalziel, J.M. 1958. Flora of West Tropical Africa. Crown Agents, London.

4. Scott, P.J. 1992. Fringe Benefits: Minor forest product collection within buffer zones as a potential tool for conflict resolution in Bwindi Impenetrable National Park. M.Sc. Thesis. Agricultural University of Norway.

5. Cunningham, A.B. 1996. *People Plants and Plant Use: Recommendations for Multiple-use Zones around and Development Alternatives around Bwindi Impenetrable National Park.* People and Plants Working paper 4, UNESCO, Paris.

RECOMMENDATIONS:

1. Basket makers groups are encouraged to participate in further analysis of the demand for basketry species. They should be involved in the monitoring of L.apocynoides and identifying alternatives for tea baskets, granaries etc. Once alternatives are identified and tested they should be vigorously promoted.

2. If demand is not reduced then the ban on use should continue indefinitely. Poaching will still continue. Restricting use for stretchers only could be a way of controlling demand. For Mpungu this would amount to two stretchers a year, and approximately 5 stems of 8m > 25mm dbh (this figure would need to be verified). This option would involve the harvesting in the forest outside of the multiple-use areas. This option should therefore not be considered until the first stage of multiple-use is implemented in all areas and is progressing well.

Immediate utilisation	NO	Monitoring Minimal
No immediate utilisation	YES	....Moderate Yes Research.....Yes Substitution Yes

PREPARED BY: R.G.Wild DATE October 1994.

DECISION OF THE MULTIPLE USE COMMITTEE:

***Smilax anceps* - DEMANDED SPECIES INFORMATION FORM BINP MUF22**

DATA BASE CODE: SMI ANS FAMILY: Smilacaceae

BOTANICAL NAME: *Smilax anceps* Willd.

SYNONYM: *S. kraussiana* Meissner[1].

LOCAL NAMES:

Rukiga: orushri (sing.) and enshuri (pl.) (pronounced Enshuri). Variants on this name are used from Kasyoha-Kitomi Forest, Bushenyi District, Uganda, south to Bururi Forest in Burundi (pers.obs.). The following information was provided by the National Museums of Kenya (pers.com. E.O. Mwangangi).

COUNTRY	LOCAL NAME	ETHNIC GROUP	COMMENTS
Kenya	Kikwa kiangoma	Kikuyu	
	Mutwari wangoma	Kikuyu	
	Mosorenit	Kipsigis	Used by Kenya Tea company for tea baskets
	Muriga	Digo	Thorns cause septic scratches
Tanzania	Linsele	Kigoma	fruits eaten by monkey
	Linselele	Kitongwe	
	Intuntu	Mbeya	leaves eye medicine
	Lukohosi	Kishambaa	roots used for infertility
	Lukwangwosale	Luguru	
	Lutandula	Bende	
	Kikwa	Kimachame	
	Likwambe	Kihehe	
	Lukwangasali	Kihehe, Kisegela, Kimbunga	
	Lende	Nyakyusa	
	Gondola	Nyika	
	Ukokozi	Bondei	
Uganda	Marugo	Ankole	

LIFE FORM: Liane

DISTRIBUTION:

BINP: Widespread

UGANDA:

Recorded at least from the following forests & woodland; Budongo, Itwara, Semliki, Rwenzori, Kibale, Kasyoha-Kitomi, Maramagambo, Bwindi, Mafuga, Lake Mburo National Park, Echuya, Mgahinga (pers.obs & FTEA).

AFRICA: FTEA;

U1-4, K3-5,7; T 1-8;Z; P; From Senegal east to Sudan and Ethiopia; Zaire and southern Africa to Transvaal, Natal, Swaziland and Cape Province of South Africa; also in Madagascar. Information from E.A.Herbarium Nairobi (pers.com. E.O. Mwangangi); specimens from the following Districts: KENYA; Embu, Kwale, Kiambu, Meru, Nairobi, Kakamega, Kisii, Taita. TANZANIA; Pemba, Unguja, Kigoma, Rungwe, Dodoma, Lushoto, Moshi, Mbeya, Makuyuni, Pare, Korogwe, Iringa, Morogoro, Kisarawe, Kasulu, Dar es Salaam, Kilimanjaro, Bukoba, Mufindi, Muheza. UGANDA; Bunyoro, Acholi, Ankole, Kigezi, Sese, Kampala.

ABUNDANCE:

Bwindi: locally abundant.

HABITAT REQUIREMENTS:

Grows on rocky sites (user observation). prefers damper situations (pers.obs.).

OCCURANCE IN SUSTAINABLE DEVELOPMENT AREA:

Reported to be persistent in cultivated areas but repeated cultivation will remove it. Now very rare outside the boundaries of the National Park.

GROWTH RATE:

Stems up to 3m per year, (informal observations in *S. anceps* Case Study).

REPRODUCTIVE ABILITY: Frequent asexual reproduction through the sending out of stolons and the development of tubers. Fruiting possibly annual, abundant fruit observed in 1993.

PERSISTENCE:

Persistent following harvesting. The location and quality of specific patches in high altitude areas of Bwindi, were reportedly learned from the grandfathers of users who themselves were old (50-60 yr.), indicating patch persistence and stability. Survives in degraded thicket and occasionally cultivated areas. Exhibits asexual and sexual reproduction.

USES:

Crop baskets (c. 1kg.), tea plucking baskets, granaries, stretchers, pot covers, winnowing trays (c.1.5kgs), kitchen items and tool handle bindings.

PARTS USED:

Stolons and stems

DEMAND:

In Bwindi the greatest demand was during June and July during the sorghum market (non-tea areas).

HARVESTING PATTERNS:

Stems; stems are harvested by cutting at ground level and pulling the stems from the canopy, which is usually low. Only few stems are harvested and old stems are unsuitable and are left. Stolons; stolons are harvested by having located one, tracing it as far back as possible to the original parent plant, cutting then pulling it from the soil/leaf litter.

QUANTITIES HARVESTED AND USED:

Informal harvesting plots in one area of the forest (adjacent to Kitojo Parish) yielded 72kg/ha/yr harvested material and 25.2kg/ha/yr of final product (assuming complete harvest every two years). Estimates of the area of *S. anceps* available for harvesting in Kitojo yielded and annual production of 537kg. This would meet 38% of the estimated annual demand from the Parish (for more detailed discussion see Case Study of *S. anceps*). The first official harvesting was carried out in Mpungu Parish, Ntendure Hill Multiple-use area. This yielded 38.4kg of *S. anceps* harvested by 11 harvesters (3.94kg each). This is 13.44kg of final product or about 13 crop baskets. Ntendure Hill multiple-use area (600ha) has abundant *S. anceps*, and assuming only half of the area has *S. anceps* this first harvest represents only 0.13kg/ha of harvested material during this harvesting event.

IMPACT OF HARVESTING:

Impact of harvesting is very low on the plant itself. Estimated to be less than 1% of the plant biomass per harvesting event, which occurs approximately every two years. The main concern would be contact between harvesters and gorillas. This will be prevented as any multiple use area will be closed when gorillas are present.

NUMBERS OF HARVESTERS:

S. anceps was one of the most demanded products from the forest and almost every household within 5kms of the forest has some household product made from it. Harvesting is not carried out

by everyone but by specialist basket makers. In agreements for the three pilot parishes it was the most used plant with 39 harvesters approved to harvest. The forest can probably support 300 harvesters.

PROCESSING:

Stolons are debarked and split into two then dried. Stored material is soaked prior to use. It takes three days to make one basket.

MARKETING:

Baskets made to order

SUBSITITUTION NEED:

No, except for tea baskets in the tea areas.

POSSIBLE FUTURE TRENDS:

It appears that *S. anceps* is more abundant in secondary and slightly degraded habitats. Given the high level of forest use (timber harvesting and gold mining) in the 30 years prior to recent conservation efforts in Bwindi, it may be that there is much suitable habitat for this species at the moment. It could be that the species will decline in the future as the forest becomes mature.

INFORMATION LACKING:

More detailed habitat requirements of the species

SUSTINABILITY ASSESSMENT:

The harvesting of this species is considered sustainable in BINP.

MONITIORING METHODS:

The harvesting levels should be monitored. It would be useful to record the species in permanent plots, which are monitoring forest change.

REFERENCES:

1. Polhill, R.M. (ed). 1989. Flora of Tropical East Africa. Smilacaceae, Cowley, E.J. Balkema, Rotterdam.

2. Flore des plants ligneuses du Rwanda, 1982.

RECOMMENDATIONS:

The species should be allowed for use. No particular controls should be made on the number of harvesters initially in the parish agreements. These should however probably not exceed 15 unless the production of the multiple use areas is seen to be very high. Quantities harvested should be recorded and monitored. Long term trends in the harvest levels should be examined and harvest levels modified based on the results.

Immediate utilisation	YES	Monitoring	
No Immediate utilisation	NO	Minimal	
		Moderate	YES
		Research	YES
		Substitutions	NO

Prepared By R.G. Wild Date: October 1994.

3.2.3 Vulnerability scoring

The vulnerability scoring was later calculated for three species, *Plantago palmata* a forb, the flowering stem of which is used as decoration on millet baskets (Ebiibo), *Smilax anceps*, and *Loeseneriella apocynoides*. These represented a range of vulnerability as identified by the rapid vulnerability assessment. Scores on a scale of 0-5 were given for each vulnerability factor (Table 20), *Loeseneriella apocynoides* scored 49/60, *Smilax anceps* scored 39/60 and *Plantago palmata* scored 18/60. As these scores were assigned intuitively based on the knowledge of a species and in comparison with other species, the actual figures have no great significance in of themselves. It would not be useful, for example, to use the scoring to set cut off points for use and monitoring levels, as the scoring cannot capture the subtlety of interactions between different vulnerability factors. Some factors are more important than others and would have to be weighted to make the scoring more accurate. It was useful, however, in focusing thinking about the vulnerability factors which are discussed below, and would help new users to develop a deeper understanding on the factors themselves.

Vulnerability Factor	*Loesneriella*		*Smilax*		*Plantago*	
	apocynoides		*anceps*		*palmata*	
growth rate	v.slow	4	fast	3	v.fast	1
reproduction	vegetative	2	vegetative	2	vegt.& seed	0
habitat specificity	high forest	4	2ry for./scrub	4	cult/trampled	0
abundance	v.rare	4	occasional	3	abundant	1
distribution	restricted	5	widespread	2	widespread	2
life form	liane	4	liane	4	ruderal forb	0
parts used	mature stem	4	young stolon	2	flower stem	1
age/size class selectivity	yes	3	yes	3	yes	3
seasonal collection	no	5	yes	3	yes	3
demand	v.high	5	high	4	low	1
trad. conservation practice	no	5	no	5	no	5
commercial use	yes	4	yes	4	no	1
Total		49		39		18

Individual scoring: 5= very vulnerable, 0 = not vulnerable; total scoring: range 0-60.

Table 20 Results of the Rapid Vulnerability Scoring

3.2.4 Interaction with Gorillas

To minimise the threat to the Gorillas from multiple-use, discussions were held with users. Very few had claimed to have seen a gorilla even when there was high usage of the forest in the 1970's. The group that more often came across the Gorillas were hunters, who hunt duikers with dogs. Consultations were held with Institute of Tropical Forest Conservation and the International Gorilla Conservation Programme (IGCP) to assess the risks and the following guidelines were adopted to reduce interaction and the risk of disease transmission to gorillas:

- Minimise the overlap between gorilla home ranges and multiple-use zones.
- Minimise user presence in the forest by the use of seasonal collection.
- Close the multiple-use zones when the resident gorilla groups are present.
- Set regulations for movement in the forest that is similar to that for tourists.
- Train resource users in those regulations.
- Monitor user presence in the forest.

- Monitor the movement of gorillas into the multiple-use zones.
- Monitor changes to the home ranges of the gorillas.

These were included in the memoranda where appropriate.

3.3 Memoranda of understanding and follow up

3.3.1 Follow up work data processing and decision making

Consultations and briefings were held with Uganda National Parks staff and other organisations locally and at headquarters. These were to discuss the various issues that were raised during the parish workshops. Plant specimens were identified at the park or national herbaria. The species summary forms were completed and decisions on utilisation and monitoring levels made. To assist in the decision making about these species I developed a flow diagram (Figure 14) that assigned species into specific categories. These decisions were presented to the nominated users for discussion. In most cases quantities were based on user levels. In a few cases limits were made and species not allowed for use, but the park authorities were open to negotiation. For example *Loeseneriella apocynoides*, was not recommended for use (section 3.2.2.) The community in Nteko argued strongly for some use. A single harvest was allowed for stretchers only (a consistent recommendation for this species), with this decision to be subsequently reviewed.

The outputs of the parish workshops, follow-up work and participatory research, were the memoranda of understanding (Appendix 4). Their purpose was to document the decisions taken in the meetings and be a parish multiple-use plan. They were not legal documents but set out the intent and responsibility of each party (Table 29). They contained the structure of the society and its objectives, the names of the office holders, nominated resource users, and the species and quantities to be harvested by each user. A boundary

Parish	Mpungu	Rutugunda	Nteko	
Fieldwork started	9 Jun 93	5 Apr 94	22 Mar 94	
Agreement signed	13 Apr 94	24 Oct 94	Dec 94	
Duration of process	10 months	7 months	9 months	Total
Number of herbalists	17	10	17	44
No. basket makers (male)	19	8	20	47
No. basket makers (female)	3	17	5	25
Total number of users	39	35	45	116
No. of multiple-use areas	2	1	1	4
Approx total area (km^2)	8.5	9.1	6.2	23.8
No. medicinal species	17	16	15	36
No. basketry species	7	11	13	21
Total species used	27	26	26	57
No. forest society members	42	19	29	90
No. executive members	5	12	9	26

Table21 Summary of parish workshops and fieldwork

description was included as well as a map of the multiple-use areas. Additional sections included activities related to the control of wildlife crop raiding. The agreements, in Rukiga and English, were reviewed by the forest society. A ceremony was held and the agreement signed by both parties (Photo 8). It was recognised that assistance would be needed in disseminating the agreements to the whole community. At small meetings the Community Conservation Rangers (CCRs) went through the agreement with each engozi, abataka or RCIs, resource users and interested community members.

The agreements took 15-20 days of fieldwork per parish over 6 to 10 months (Table 21). The seven months taken for the Rutugunda agreement was appropriate and allowed sufficient "gestation" time between meetings. The other agreements took too long due to inexperience and delays due to competing work. Occasionally community members wanted to move more quickly, but overall they were satisfied with progress. Periods shorter than six months could jeopardise the process. At this rate, however, negotiations for the remaining 17 parishes would take 3 years. At the time this seemed too long for the last parishes to wait, however, the whole programme was put on hold for five years. Speeding up the process could cause reduced participation. The process may speed up as word spreads elsewhere, especially if it is successful. In negotiating the agreements the role of community members, who were park or project staff were particularly important, having the knowledge and confidence of both groups.

3.3.2 Plants used, quantities agreed

In the three pilot agreements 36 species of medicinal plant and 21 basketry species were sanctioned for use (Tables 22 & 23). Total annual quantities agreed were small, less than

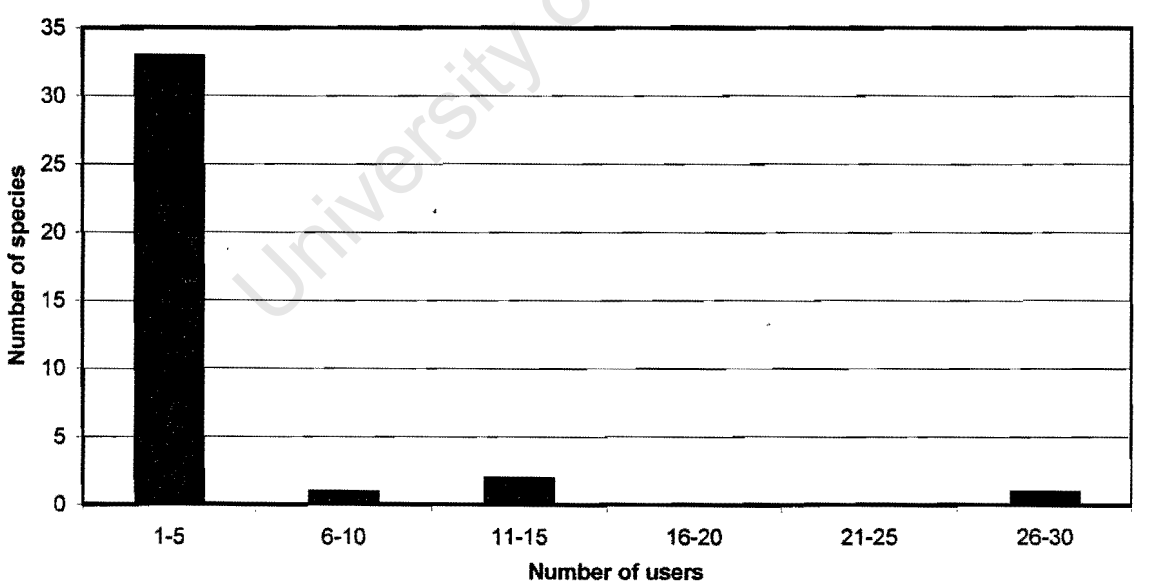


Figure 20 Number of medicinal plant sp. against numbers of users, in the 3 pilot parishes.

FAMILY	SPECIES	LOCAL NAME	LIFE FORM	PAR USE	No. OF USER MP	RU	NT	TOT. USER	TOTAL QUANTIT USED PER YEAR
Rubiacae	Rytigynia kigeziensis*	Nyakibazi	tree	bark	14	3	6	26	68 handfuls
				leaf			2		4 handfuls
				root			1		20 fingerlengths
Lauraceae	Ocotea usambarensis	Omwiha	tree	bark	7	1	5	14	160 handfuls
				leaf			1		20 handfuls
				root			1		2 arm lengths
Piperaceae	Piper guineensis	Rukokota	liane	root	7		5	14	720 fingerlengths
						1			8 handfuls
				bark			1		2 handfuls
Rhamnaceae	Gouania longispicata	Omufururа	creeper	leaf	7			9	84 handfuls lvs
				stem		1			2 ft of stem
				sap			1		20 handfuls
Euphorbiacea	Croton macrostachyus	Omurangara	tree	bark	5			5	2.5 handfuls
Marattiaceae	Morattia fraxinea	Omutumbagire	fern	leaf	4			4	480 leaflets
Euphorbiacea	Neoboutonia macrocalyx	Omwanya	tree	leaf	4			4	12 handfuls
				bark	4				12 handfuls
Rosacae	Prunus africana*	Omumba	tree	bark.	4			4	48 handfuls
Celastraceae	Maytenus acuminata	Omulembwe	tree	leaf	2	1		3	36 handfuls
Myricaceae	Myrica salicifolia	Omugyegye	tree	bark	1	2		3	28 handfuls
		Isubyo	shrub	leaf			2	2	40 handfuls
Zingiberaceae	Afromomum sp.	Obuzi	herb	leaf		1		2	8 handfuls
Fabaceae	Albizia gummifera	Omuragaza	tree	leaf		1	1	2	36 handfuls
Theacae	Ficalhoa laurifolia	Omuvumaga	tree	bark	2			2	24 handfuls
Rosaceae	Hagenia abyssinica	Omugesi	tree	bark			2	2	24 handfuls
Mrysinaceae	Maesa lanceolata	Omuhanga	tree	leaf			2	2	40 handfuls
Rhamnaceae	Maesopsis eminii	Omuguruka	tree	bark	2			2	24 handfuls
Loganiaceae	Nuxia congesta	Omubuzigye	tree	bark		2		2	24 handfuls
Amaranthacea	Seriostachys scandens	Omuna	liane	leaf			2	2	40 handfuls
Myrtaceae	Syzigium guineense	Omugote	tree	leaf	2			2	24 handfuls
				bark	2				24 handfuls
Rutaceae	Zanthophylum macrophyl	Omushaga	tree	bark	2			2	12 handfuls
Rutaceae	Zanthophylum sp.	Omushaga	tree	bark			1	2	12 handfuls
				leaf			1		20 handfuls
Loganiaceae	Anthocleista sp.	Omunyinya	shrub	bark			1	1	12 handfuls
Euphorbiacea	Clutia abyssinica	Omubarama	shrub	leaf		1		1	24 handfuls
Euphorbiacea	Croton sp.	Omurangara	tree	leaf			1	1	20 handuls
Cyatheaceae	Cyathea manniana	Ekigunju	tree	leaf	1			1	6 handful
				bark	1				6 handfuls
Sterculiaceae	Dombeya goetzenii	Omukore	tree	leaf			1	1	20 handuls
Proteacea	Faurea saligna	Omurengyere	tree	bark			1	1	12 handfuls
Moraceae	Myrianthus holstii	Omwifa	tree	fruit	1			1	12 fruits
	Notonea sp.	Otunyarufuzi	creeper	leaf		1		1	4 handfuls
Adiantaceae	Pellaea viridis	Orushwiga	herb	leaf		1		1	8 handfuls
Clausiaceae	Symphonia globulifera	Omusisi	tree	bark	1			1	12 handfuls
Asteracae	Vernonia smithiana	Otunyarogong	herb	leaf		1		1	8 handfuls
		Ekyururu	climber	leaf			1	1	20 handuls
		Enkiriahakye	herb	stem		1		1	2 ft.
		Obuteraganyi	herb	leaf		1		1	8 handfuls
		Obutungo	herb	root		1		1	4 handfuls

* Potentially vulnerable species MPU = Mpungu, RUT = Rutugunda, NTE = Nteko Parishes

Table 22 Summary of medicinal plant species sanctioned for use

40 handfuls of bark or leaves for most medicinal plants, and were to be harvested in an area totalling 23.8 km^2. Seventy seven percent (44) of the species named were collected by five or less harvesters (Figure 20 for medicinal plants). In the agreements herbalists were to collect approximately once a month, while basket makers would collect in two seasons, with approximately 6 days in the forest per year.

Excepting women basket makers, who collect in groups in limited areas often at the forest edge, there were 91 nominated harvesters. This gave a user density in the use areas of c.0.038/ha. As users agreed to visit the forest on c.10 days per year (c.6 hr/day), and were allowed to be accompanied by one registered apprentice, user presence in the multiple-use areas would be c.4.6 person hr/ha/yr. Monitoring will provide actual figures to compare with these projections.

The total area allowed for multiple-use is 20% (66km^2) of the forest. The area for the three parishes is 7.2% of the forest and 36% of the multiple-use zone. To adhere to the 20% provision each parish should use 3.3km^2. The average area of forest for each pilot parish (7.9km^2) is double this. This is not necessarily too much, as two of the pilot parishes are large with long forest boundaries, and Rutugunda is likely to share its multiple-use area with Bushura Parish. Also, several parishes are smaller and will use below average areas. The areas allocated, however, will need to be carefully assessed, as other agreements are negotiated, so the total area assigned to multiple-use remains within the permitted zone size. If necessary some pilot multiple-use areas could be reduced in size, as some areas not used for harvesting were included in the multiple-use areas so as to locate a clear boundary.

Four species were identified as vulnerable; *Prunus africana*, *Celtis durandii*, *Rytigynia kigeziensis* and *Loeseneriella apocynoides*. Only one heavily debarked specimen of *Celtis durandii*, a common forest tree in many Ugandan forests, was found in the multiple-use areas and users agreed to use a common shrub as a substitute. *Prunus africana* was not considered vulnerable at BINP, but was given this status due to the international trade in its bark, which is threatening the species across the continent (Cunningham and Mbenkum, 1993).

It is hoped that the nominated herbalists will act as a buffer for this species should attempts be made to recruit commercial collectors locally. Small quantities of the other two species were allowed. Of these *Rytigynia kigeziensis* is at most risk. Substitution by harvesting less damaging parts of the plant (leaves, branch bark) may prove the best option. A user group was to be formed to address this issue, and further research was carried out by the Institute of Tropical Forest Conservation (Kamatenesi-Mugisha, 1997).

Species used by men		Seasons: June-July and November-December							
FAMILY	SPECIES	LOCAL NAME	LIFE FORM	PART USED	No. OF USERS MP	RUT	NTE	TOT. USERS	TOT.QUANTITY ALLOWED/YR
Smilacaceae	Smilax anceps	Enshuri	liane	stolon	18	9	12	39	180 headloads
Agavaceae	Dracaena laxissima	Enchenche	liane	stem	18	5	9	32	82 headloads
	Monanthotaxis littorala	Entaaro	liane	stem	17	4		21	400 8ft sticks
Vitaceae	Cyphostemma bambuseti	Embungwe	liane	stem			10	10	40 headloads
		Endengematare	liane	stem			7	7	26 headloads
Urticaceae	Urera hipsillodendron	Emishe	liane	stem			5	5	20 headloads
		Engondero	liane	stem			5	5	20 headloads
Tiliaceae	Triumfetta sp.	Omunaba	shrub	stem			3	3	12 headloads
		Bikaku	liane	stem			3	3	6 headloads
		Emisheshe	liane	stem			3	3	12 headloads
		Omwatamabare	liane	stem		3		3	12 headloads
Euphorbiaceae	Alchornea hirtella	Ekizogwa	shrub	stem		2		2	8 headloads
Celatraceae	Loesneriella apocynoides*	Emijega	liane	stem			2	2	2 headloads
Clusiaceae	Symphonia globulifera	Obukozo	tree	gum			2	2	8 handfuls
		Ebyeyate	liane	stem		2		2	8 headloads
		Endengamatare	liane	stem		2		2	8 headloads
		Nominated male basketmakers			19	9	19	Total men 47	

Species used by women		Seasons: June-July and November-December						
FAMILY	SPECIES	LOCAL NAME	LIFE FORM	PART USED	Group Visits/Yr MP	RUT	NTE	TOT QUANTITY ALLOWED/YR
Poaceae	Elusine indica	Enchenzi	grass	flower stem	10			40 bundles
Marantaceae		Obukogoso	shrub	stem	10	10	12	140 bundles
Zingberaceae		Ebitatara	shrub	flower stem	10	10		80 bundles
Marantaceae	Marantochloa leucantha	Omwiru	shrub	stem	10	10		80 bundles
Tiliaceae	Triumfetta sp.	Omunaba	shrub	stem		10		40 bundles
Arecaceae	Raphia farinifera	Ebihungye	palm	leaf shoot			6	60 bundles
		Nominated womens leaders			3	17	5	Total women 25

* Potentially vulnerable species

Table 23 Summary of the quantities of basketry species agreed for harvesting in the collaborative management agreements.

3.3.3 Harvesting

Harvesting (Photo 9) began after signing the agreements and harvesters were to be accompanied by park staff, until this was considered unnecessary. This allowed the rangers

to learn more about the species, harvesting and areas, as well as getting to know the resource users better. Community members only really began to believe the activity was genuine when they began to collect the materials. Before that many nominated users still felt there was some deception by the national park and they had been told by others that they were wasting their time attending meetings.

3.4 Monitoring

Close monitoring is a key aspect of adaptive management of utilisation. As part of the parish workshops five types of monitoring were identified and planned for implementation. In some cases previous data were examined and baselines were established.

3.4.1 Illegal activities

For successful community utilisation of park resources:

- Information on infractions must reach decision makers from the park and the community.
- Communities must have the mechanisms to control their own members.
- Park authorities must have the capacity to enforce the decisions agreed in the joint management agreements, even to the point of community exclusion (Sayer, 1991).

Using illegal activities as an indicator of programme effectiveness is not straightforward. A decrease in recorded infractions can mean illegal activities are decreasing or conversely that ranger patrols are ineffective. An increase in arrests may simply indicate improved patrol effort, not an increase in infractions (Infield and Adams, 1999. Patrol effort needs to be recorded and past Bwindi patrol records were inadequate for the following reasons:

- Only patrols which produced an arrest or confiscation had hitherto been recorded and patrols which had no incidents were not recorded making it impossible to calculate the patrol effort.
- Incomplete record was kept of the length (number of days) of patrols.

- Location data was sometimes vague and needed to be more precise.

The patrol record system was revised and included data on community assistance in illegal activity control. It was too early to evaluate the extent that this was happening but initial indications were positive. Over the first two years that beekeeping was operated with Uganda National Parks agreement, there were no fires in the beekeeping areas. Prior to that, fires occurred each dry season. Park staff were warned when fires approached the park boundary. Feedback from rangers indicated that some beekeepers, however, were using the pretext of checking their hives to set snares. Park wardens held meetings with the beekeeping societies who warned and fined individuals. During a forest survey, illegal pole cutting was encountered and traced to the home of a newly nominated user who was fined five litres of local beer and ordered to plant 50 trees. In Mpungu parish staff were twice informed, by nominated resource users, of poaching. A resulting patrol caught two poachers, one of whom escaped while the other was fined USH 4,000 (US$4) by the police. The poacher who escaped was apprehended by his stretcher group and fined a goat (US$20) and a drum of beer (US$20), an amount ten times the police fine.

3.4.2 Utilised species monitoring

Utilised species were to be monitored at three levels of intensity, depending on their vulnerability. With support from the Community Conservation Rangers users were to record off take. For example, 11 harvesters collected 38.4 kg of *Smilax anceps*, on the third collection from Ntendure area (22.7.94). This was 1.3kg per person, with a range of 1.3-5.7kgs. Declining harvests would be investigated, which may be due to other factors such as forest regeneration. The levels of monitoring intensity were:

- Minimal Monitoring: For the least vulnerable species off take and user reports were to be used.
- Moderate Monitoring: In addition to off take, harvests will be measured from permanent plots.
- Intense Monitoring: Permanent plots will also be established but in greater numbers and outside the multiple-use areas. More information will be collected from the plots, and records made of off take from the multiple-use areas.

During the first few harvests the multiple-use team were present and measured the weights of the items collected by each harvester. It was learnt that some resource users were not fully aware of the quantities they were allowed to harvest. Harvesters also felt the weighing and measuring of the harvested material was policing of their activities, rather than monitoring of the sustainability of the resource. Measuring off take was to be carried out by the community or patrol rangers and eventually by the resource users as their capacity developed.

3.4.3 Monitoring secondary ecological impacts

Two secondary effects of utilisation can be recognised, the impact on species dependent on a used species, and the impact derived from the presence of the users in the forest. No dependent or mutualistic relationship has yet been identified with a utilised species. Utilisation levels are very low and are not expected to change the range, abundance or size classes of the utilised species. Interactions of most concern are between users and gorillas. Park staff and the Institute of Tropical Forest Conservation already monitor gorilla groups. Rangers nominated to be responsible for specific multiple-use areas were to monitor the movements of gorillas into those multiple-areas, which would then be closed.

3.4.4 User presence monitoring

User presence was to be recorded during each harvesting event. The results can be compared with the agreements and also tourist and rangers presence levels

3.4.5 Community attitudes

Limited resource use, it was hoped, would improve the attitude of the community towards the park. This approach has been tried elsewhere (Infield, 1986; Mkanda and Munthali, 1994). At Bwindi a number of attitude questionnaire surveys have been administered (Table 24). There are often doubts expressed about the value of questionnaire surveys (Chambers, 1992, 1997) and they are not free of biases. These attitude questionnaires showed that the communities value the forest highly, largely for resources. During the parish workshops I developed an alternative participatory rural appraisal technique for

monitoring the park/community relationship. It has been named a "Ground Relationship Graph" and has been used with resource users, people suffering from baboon crop raiding, and park rangers. The technique established the change in relationship between the community and the forest

Questions	Survey			
	DEC 1991	AUG 1992	DEC 1992	JUN 1993
% Forest's existence of value to household	-	86	80	-
% Knowing why the park created	16	52	56	70
% Happy with change to park	18			v.negative
%Consider they will benefit from the park		51	46	
% Consider they will be negatively affected by park			78	
% Fearing the park	many	44		

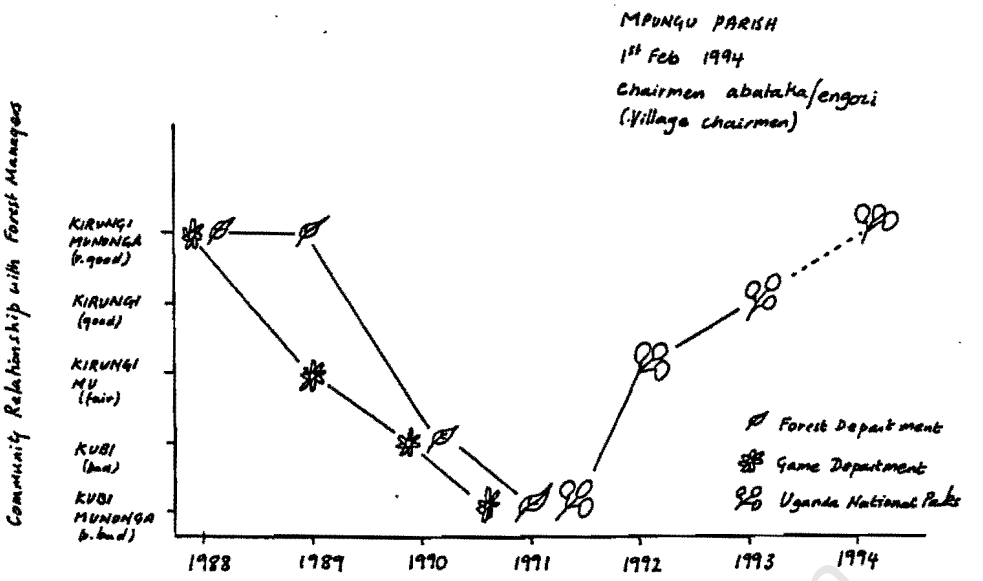
Surveys: Dec 1991 (Scott, 1992); Aug 1992 (DTC, 1994); Dec (Docherty, 1993); Jun 1993, (Kyampaire and Atakunda, A. 1993)

Table 24 Results of past attitude questionnaires

managers over a period of years and the reasons for those changes. A graph was set up on the ground with years on the x-axis and the relationship with the park on the y-axis. For each year the group discussed the relationship with each of the management authorities, and placed appropriate local materials at the relevant positions (Photo 7). This method consistently recorded the decline in relationships with increased law enforcement and then recent improvements due to conservation education, allowing RC courts to judge park infringements, the promise of resource use, agricultural support and lower expectations of a national park (Figures 21-23).

A possible criticism of the method is that as the group about which the attitudes are asked is the group facilitating the session. This could lead to exaggeration of the current "good" relationship, as the community would not want to offend the facilitators. While this may have happened, the results from the community are very similar to those of park rangers, who were on the same 'side' as the facilitators. The results are certainly better than some independent questionnaire surveys which had people hiding in their fields fearing land adjudication for park expansion. This participatory rural appraisal approach has an advantage over surveys that establish attitudes on one day, as the results are in a historical

context. The graphs were produced as a baseline for monitoring the joint management agreements, with the intention to return to the group to monitor change when earlier results can be checked. Recent evaluations have indicated an improvement of relationships with park staff (Bensted-Smith, 1995; Watts *et al.*, 1996).



Indicators

Forest Department:

1988 – 1989	Allowed most activities.
1990 – 1991	Closed forest to pitsawing.

Game Department:

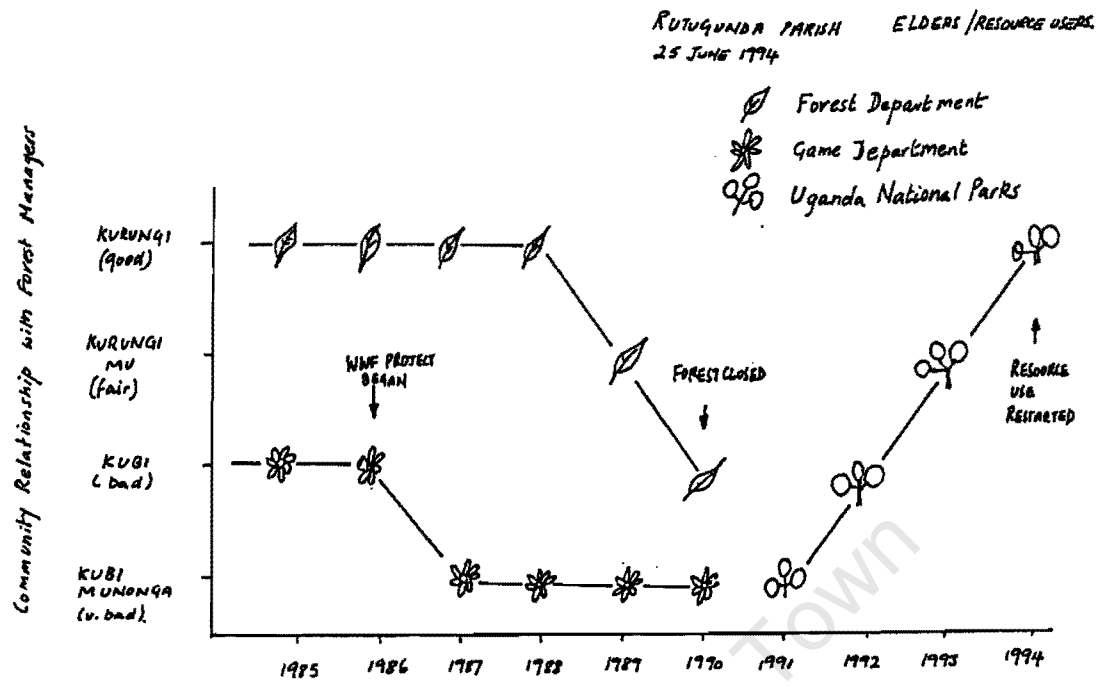
1988	Allowed acess to materials and pitsawing
1989	Began harrassing pitsawyers, rumour forest will become park.
1990 - 1991	much conflict.

Uganda National Parks:

1991	Rangers threatening with their guns, we were ready with spears
1992	Conservation education, promise of benefits, Agricultural assistance. Rangers stopped harrasment. RC's handling infraction cases.
1993	Ranger behaviour improved, Growing more own materials Resource use programme started, Conservation Education.
1994	Expect relationship with park to further improve if resource use programme effective.

Recorder R. Wild.

Figure 21 Ground relationship graph, Mpungu Parish, Bwindi Impenetrable NP.



Indicators

Forest Department:

1985 - 1988 Allowed cultivation & people to collect forest products. Pitsawing allowed.

1989 - 1990 Stopped millet growing and pitsawing

Game Department:

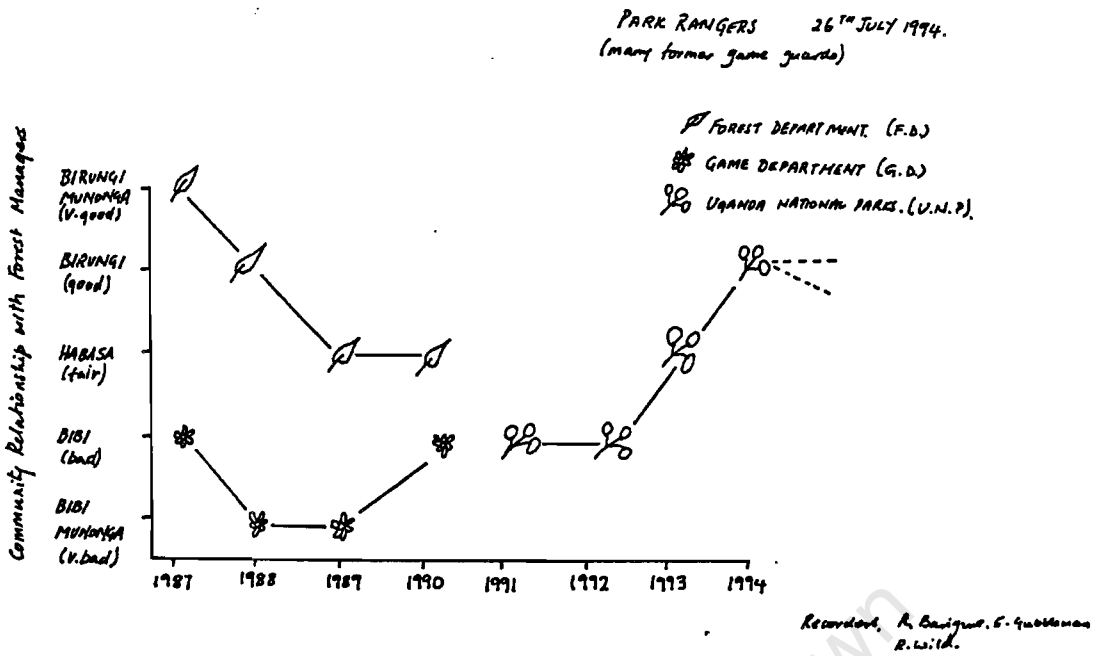
Bad throughout, did not want people to go in, hunting and harvesting stopped.

Uganda National Parks:

Rangers doing their jobs nothing against them.

Recorders: S. Magume, B. Akunda, R. Barigyre, R. Wild.

Figure 22 Ground relationship graph, Rutugunda parish, Bwindi Impenetrable NP



Indicators

1987 F.D. Pitsawying, grazing and illegal goldmining allowed. FD more power than G.D.

G.D. Against activities allowed by F.D. which brought conflict with community

1988 F.D. Still gave out what people wanted. e.g. paid for a permit for 2 trees, and additional Money to fell 5 trees. When G.D. stopped this F.D. refused to repay bribes.

G.D. Halted illegal activities. When Game Guards entered villages, people blew horns & beat drums to warn people in the forest. Game Guards stoned and F.D bribed Army to beat them. Even relatives of Game Guards chased from villages, when visiting. Abataka would fine market traders selling food or beer to Game Guards.

1989 F.D. Lost powers to allow resource use. Timber dealers and goldminers lost confidence in them, but realised it was not their fault.

G.D. As 1988.

1990 F.D. Rumours began that forest would become a National Park. F.D. supported people saying "Stay from it won't become a N.P. & you will have access."

G.D. People could see G.D. was winning and thought they should improve relationships with them. Game Guards could buy food.

1991 F.D. Disappeared

G.D. People thought G.D and the RC's had sold forest to the whites as Park gazetted and visitors came.

1992 UNP No resource use, Feared other animals would be introduced and that park would expand. DTC seen as on park side

1993 UNP Accepted park would stay. Conservation education and DTC activities changed attitudes of community leaders.

1994 UNP Park softening, Promise of resource use true. Promise of revenue sharing.

Future UNP Due to wildlife crop damage will never get much better and may slide back

Figure 23 Ground relationship graph, park rangers, Bwindi Impenetrable NP.

4 CHAPTER FOUR: DISCUSSION

This study examined a wide range of elements of what has become the integrated conservation and development paradigm, recently referred to as the 'new conservation' (Hulme and Murphree, 1999). Integrated conservation and development contains within it diverse elements, which have, over the last 15 years, been evolving (Wells and Brandon, 1992, Alpert, 1996, Wells et al., 1999. To place these diverse elements together in a logical pattern and in relationship to the establishment of resources use in the national parks of southwest Uganda, I have developed a framework, which I hope, assists with the considerable complexity, which surrounds the subject. The labels that I have used in this framework could be used interchangeably and I do not place a high weight on the specific use of each, but have simply used them to help define a relationship between these elements. I have aimed to use terms that reflect the specific (tools) up to the all encompassing (paradigm). They are also used as a way to structure the discussion of the results of this study.

At the highest level of this framework (Figure 24) is the conservation **global model** (or paradigm) of integrated conservation and development. A number of **approaches** to achieve this conservation paradigm are recognised. The use of in-park plant resources is one such approach, while others include the protection and substitution of park resources, the sharing of other assets, such as tourist revenues, and appropriate development within communities living adjacent to the park. From the results of the study, I consider that joint or collaborative management then becomes the **method** for implementing in-park plant use addressed here but, which could also be used for the other integrated conservation and development approaches.

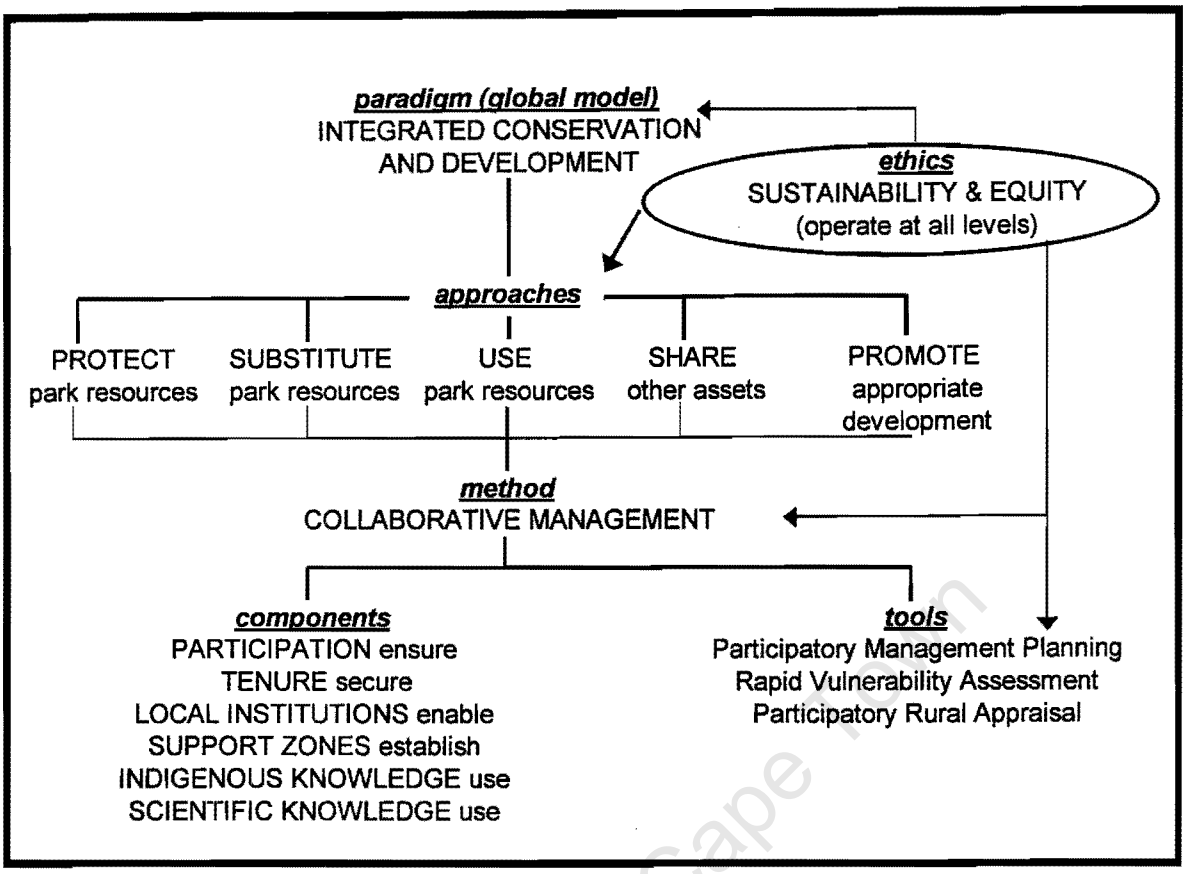


Figure 24 Framework for conservation and development at Bwindi and Mgahinga forests

I consider collaborative management to have six main **components**; participation, tenure, institutional arrangements, indigenous knowledge, scientific knowledge and support zones. To implement these components during this study, three **tools** were used and evaluated; participatory park planning, rapid vulnerability assessments of plant species and participatory rural appraisal. Within this framework equity and sustainability are considered as **ethics**, or guiding principles operational at all levels of the framework and are also briefly discussed. The discussion of the results of the study begins at the lowest level of the framework, joint management tools, and proceeds up the framework ending at the integrated conservation and development paradigm.

4.1 Tools for joint management

Three tools to establish joint management of plant use, participatory planning, rapid vulnerability assessment and participatory rural appraisal, are discussed here.

4.1.1 Participatory management planning

The participatory planning meetings, the output of which was the park management plans, were the first occasions that park staff and community leadership from either park had sat down together, to plan and discuss issues related to the management of a Ugandan park. This was a very significant step given the serious conflict between the two sides. The output of this is only assessed anecdotally and no formal evaluation of the impact of the management planning process on community park relationships was carried out. The comments here then are based on workshop evaluations, discussions with individuals and comments from community members that were not participating in the workshops, and simply indicate, not prove the value of this approach. Community participants were pleased to be invited to put their views across about the parks. It gave them an opportunity to express to the park authorities the negative impacts of the parks on the livelihoods of their communities. It helped community members and park staff to get to know each other on a personal level and develop personal relationships. This process therefore began a genuine and, I would argue, meaningful community participation in park management enhanced park interaction with the communities and local administration. The main benefit related to the focus of the study, resource use, was the establishment of a planning context for parish level negotiations over resource use.

A wider set of benefits related to integrated conservation as a whole were seemingly:

- Community costs resulting from conservation were documented and better understood at senior park staff levels.
- The development of planning based on a better understanding the realities and views of different stakeholders and based, where possible, on consensus.
- The discussion and identification of solutions to urgent conflicts, action plans were produced and implementation begun.
- Community representatives were exposed to conservation objectives and some became advocates for conservation within their own communities.
- Promoting ownership among park staff for the park plans, reducing the likelihood that they would be ignored by the implementers.

- Recognition by the community leadership of the potential benefits to be realised from Park status.
- The establishment of mechanisms for community involvement, and ownership of park management.
- The use of local knowledge to answer specific questions related to management.

The process of producing the plans therefore became equal if not more important, at least initially, than the product of a plan document. This process of planning contrasted with previous, but at that time, recently completed Uganda National Parks plans (Olivier, 1990, 1992 a&b), produced by an external expert and based on consultations mostly with park staff and did not enjoy any of the above benefits. The final output of participatory planning for Bwindi (Wild and Serugo, 1993) was less polished than the three earlier plans and required refining. The Board of Trustees returned the first draft of the Bwindi plan for further editing, not disagreeing with the content but saying it read as if it had been produced in a workshop, which it had!

Early calls for local involvement in the management and management planning (Blower, 1984) have been heeded and involvement is being increasingly recognised as essential.

> "The need to involve local people directly in the planning and management of natural resources is increasingly viewed as essential for the conservation of those resources, this message is equally relevant to protected areas, although it has yet to be addressed adequately by most protected area managers". (Walters and Renard, 1992).

Stevens (1997) considers the involvement of communities in park management in some depth, and considers the formal public input in the writing and revision of management plans is at a higher level of consultation.

> "At its strongest, consultation is an ongoing process which infuses all dimensions of protected area management with indigenous perspectives, knowledge and concerns. Such consultation affects the establishment of the protected area, delineation of its boundaries and the boundaries of management zones the development of master [management] plan, staff appointments and particular policy and regulations and their implementation and enforcement." (Stevens 1997).

The efforts to include communities at Bwindi and Mgahinga in management planning attempted to achieve a higher level of consultation and have had some positive outputs. The mechanisms for involving communities in the planning process did, however, present challenges of representation, which are discussed in section 4.1.1.2.

4.1.1.1 Planning methods

Of the two planning methods used, that is; i) informal small group discussion/plenary at Bwindi and ii) the more formal and structured ZOPP with Logical Framework Analysis at Mgahinga the ZOPP/Logical Framework Approach was a more satisfactory process, having the following advantages:

- The use of a non-participating "moderator" trained in the technique who could facilitate, mediate and guide the process. As the moderator was well versed in the planning technique he guided the group through the sometimes intricate steps of the ZOPP/LFA approach
- Focusing and reducing conflict to critical points and using formal techniques to deal with these points
- Structured analysis using effective participation methodology
- Setting realistic indicators which guide the monitoring programme

The introduction of "objectively verifiable indicators" would in theory be a useful addition to park planning as it defines measurable standards for plan progress, and allows for more objective and critical measurement of that progress. Detailed impact monitoring of the implementation of management actions will, in practice, require additional capacity in human, physical and financial resources that were, however, not available in Uganda at the time of planning, with the likely consequences that monitoring will not be carried out effectively.

The LFA/ZOPP process, however, is not always easy, and at times is very hard work. On one occasion, guided by the very experienced, professional moderator, the net result of the various processes of the day's activities was to move eight cards from one board to another, these cards however represented eight major planning decisions in a situation of conflict

with diverging view points among participants. The eight cards represented making critical decisions regarding the main objectives of the Mgahinga National Park plan and represented a major breakthrough in consensus planning that was needed at Mgahinga.

While several of the park support projects in the East African region have used a logical frame work with the ZOPP analysis for project design, this was the first time this method had been applied to a park plan itself, as far as I am aware.

4.1.1.2 Selection of Community representatives

There was a significant difference in the process of selection of the community representatives for the planning sessions at the two parks. At Bwindi senior park and project staff, identified community leaders that were known to them or to other park staff, who had been active in the project programmes or who were involved in park issues. Three were selected for the Bwindi management plan production, one from each district in which the park fell. One was a CARE Development Through Conservation project extension staff, well respected within his community, one was a schoolteacher who had been involved in the projects education programme and another was an ex-gold miner and local leader.

At Bwindi therefore three selected community members participated in the workshops, but without a mandate from the c.100,000 people that lived next to the park. At the same time it was very difficult for those three people to return from the workshops to brief other community members and to return to the meetings with a "community position" on a particular issue. At that time there was no institutional structures for them to work through, and they were not supported by the park or projects to spend the amount of time necessary for them to effectively communicate with the whole community (see section 4.1.4). The "selection" of community participants and not "election" of participants was not ideal (Blomley *et al.*, 1999). At the time, however, it was the first and genuine effort to involve communities in park management and not simply tokenism. The community representatives could only proffer an opinion on the likely impact of and community response to any decision taken during the planning workshops, and by doing this greatly improved the acceptability of the management plan to the wider community. They were

not however democratically elected, or mandated to make decisions on behalf of the community. This inadequacy in the first (Bwindi) plan was recognised and for the second (Mgahinga) plan, with only three Mgahinga parishes opposed to the 22 for Bwindi, it was possible to elect representatives. A process was developed and a series of meetings were held with any interested individuals from all (c.10) villages in the each parish. At these meetings issues regarding the park were raised and documented. Also at the village meetings representative were nominated to attend a parish meeting. In the parish level meeting each village raised their issues, and then each parish elected two community members (a man and a woman) to participate in the park planning workshops. There were therefore six community members who had been elected from the Parishes and who had a mandate to raise issues at the workshops. They also had a structure by which they could return the outcomes of the several workshops and receive opinions about the plans. The level and depth of representation in park planning was, therefore, improved for the smaller community at Mgahinga. The completed plans were also presented back to communities at both parks on completion of the final draft.

Shortly after the fieldwork for this study was completed in 1994 the mechanisms for representation for the Mgahinga and Bwindi Impenetrable Trust Fund of the Global Environmental Facility were developed. Interestingly the three communities members selected for the Bwindi management planning workshops went on to be elected to represent their districts on the local community steering committee for the Trust. This was most likely due to a) the community having confidence in these individuals, and b) the additional knowledge and experienced they gained as individuals from participating in the planning process, enhanced their suitability for these subsequent positions. In later work, also not part of this study, park, local authority and project staff, through a stakeholder process developed a more comprehensive institutional mechanism for negotiating park community issues for both parks (Blomley *et al.*, 1999).

4.1.2 Rapid vulnerability Assessment

The rapid vulnerability assessment tool addresses the difficult question of which species can be used with least chance of overuse. This is particularly important in the prevailing

- Low funding levels.
- Shortage of time.
- Lack of trained botanical personnel.
- The patchy nature of the utilised plant distributions, meaning that few would be encountered in randomised plots.

The approach of Hall and Bawa (1993) fits into Peters (1994) schematic as detailed forest inventory providing a methodology for detailed ecological studies of harvested species, as well as providing inputs into yield, regeneration and harvests assessments, which is the way their recommendations were used at Bwindi (Muhwezi, 1997). Cunningham's RVA focuses on the "selection" first step of the process and provides the "first cut" of information on species used abundance and distribution, regeneration, harvesting and its management.

Integrating ecological and social data

Peters (1994) limits himself to the ecological context of non-timber forest product harvesting with particular emphasis on the structure and dynamics of tree populations, while recognising that economic and social factors are critical to utilisation. Hall and Bawa (1993), also focus on the ecological methods of measuring and monitoring impact of utilisation also agreeing that ecological sustainability cannot be considered in isolation from economic considerations. The RVA also collects social and economic data and uses the participation of resources users in data collection, therefore, it can integrate the ecological with the social and the economic.

> "Biology is the ultimate determinant of sustainability – species and ecosystems die, survive or flourish depending on whether their ecological requirements are met. Nature provides the grist to meet those requirements, but it is the mill of social organisations, individual decision makers, and markets – not nature – that determines whether the ecological requirements of species and ecosystems will be met. Thus sustainability depends on political, socio-economic and institutional factors". (Alcorn, 1993).

Used as it was here with PRA techniques as part of a programme to enlist formal community participation in evaluating resources use, RVA initiated the process of collaborative management.

4.1.2.2 RVA decisions compared to detailed ecological studies

Subsequently two of the species identified as vulnerable using the RVA system were the subject of detailed single focus ecological/ethnobotanical studies by MSc Students from Makerere University, Kampala (Muhwezi, 1997; Kamatenesi-Mugisha, 1997). These studies were supervised both from the University and from staff of the "People and Plants" Initiative (WWF/UNESCO/KEW) which also provided financial support.

One of these studies was on *Loeseneriella apocynoides*, which then provided a useful comparison to the RVA as it was applied at Bwindi. The RVA was implemented in two parts, firstly by Cunningham (1996) as part of a 5 week study which examined over 260 species, and secondly during the one year establishment of extractive resource use, where a total of 57 species were sanctioned for use in three pilot parishes (this study). In his study of *Loeseneriella apocynoides* Muhwezi (1997) followed the methodology of Hall and Bawa (1993) and collected data on the species from 1km x 10m transects in locations of this species identified by local users.

Item	Cunningham (1996)	This study	Muhwezi (1997),
Fieldwork	1992	1993-1994	1996
Areas covered by surveys	?	Mpungu Parish. 4 forest locations	Parishes: Nteko, Mpungu and Rutugunda, Kitojo , 7 forest locations
Forest Plots	None	14 of 10mx10m	8 x 1 Ha (200 20mx20m)
Product Survey sampled (n)	None measured	Tea baskets 20 Granaries 6 Stretchers 0 Pot covers 1	Tea baskets 179 Granaries 303 Stretchers 46 Pot covers 150? Agriculture baskets 209
Growth rate (yrs to harvestable size)	10-20yrs (user info)	10-15 (20) yrs (user info)	21.9yrs (measurements)
Re-sprouting after cutting	Yes	Yes	Yes, but limited
Flowering		None recorded	1 resource user record of flowering
Ecological relationships	None	None	With *A.hirtella* as an important trellis species
Distribution	Clumped	Clumped	Clumped
Demand (Mpungu only)	Tea baskets 600kg/yr	Tea baskets 550 kg/yr Granaries 669 kg/yr Stretchers 5.8 kg/yr Pot Baskets 74 kg/yr Total Mpungu 1298 kg/yr	Tea baskets 593 kg/yr Granaries 791 kg/yr Stretchers 9.6 kg/yr Pot Baskets 45 kg/yr Total Mpungu 1439 kg/yr
Supply	Scarce	11.5 kg/ha/d20mm 57.6 kg/yr/d20mm total large sizes have not been available for the last 10ys. user info.	1.9 kg ha/yr/d 30mm 27.6 kg/yr total area 1960's 1hr to collect a load, 1992 7-8 hrs to collect a load. Harvest size 1960's d=4.4cm, 1992 d=2.0cm
Total harvestable area	Limited	5ha (Mpungu) based on user information	"Expected area" with *L.apocynoides* 6.8 km^2
Recommendation	Closed for four yrs, then preference given for stretchers. Harvesting could be on a rotational basis.	Harvesting does not threaten short to medium term survival, but may reduce flowering and sexual reproduction, can be harvested for stretchers.	Because of the low supply compared to the demand allowing harvesting for the major uses (granary and basket making will still be banned. However, given the importance for the stretches in the transport of the sick, expecting mothers and the dead, coupled with their low demand on the resource, harvesting should be allowed. Harvesting for this item should be controlled and monitored.

Table 25 Comparison of data coming out of RVA and detailed ecological studies for *Loeseneriella apocynoides*.

Table 25 compares data collected through the two stages of the RVA and the yearlong single species study. Importantly it shows that the general recommendations remain much the same in all three studies. Cunningham recommended that the species not be harvested

for four years and that from then on harvesting be rotational with preference being given to stretcher makers. In this study it was recognised that harvesting would be very unlikely to lead to extinction of the species, but that it was not common in the forest and was all but exhausted. Likewise, it could be harvested for stretchers at some point in future. In the Nteko MOU a single one-off harvest was allowed. The comprehensive study (Muhwezi, 1997) recommended that harvesting should be allowed but for stretchers only. Underlying these recommendations were some differences. The calculations of demand were comparable between those made in this study, with differences attributable to different assumptions. For example I assumed that the longevity of stretchers was 10yrs based on a sample of 10 stretchers made from *L. apocynoides* with mean age 5.5 years and range 3.2-14yrs, Muhwezi (1997) used an estimate of 5yrs longevity based also on user discussions but including stretchers made with shorter lived species. The supply calculations, however, showed more divergence. In this study I calculated a higher annual harvestable amount and a smaller harvestable area in the forest.

4.1.2.3 Disadvantages of the RVA

The disadvantages of the rapid vulnerability assessment system, in my experience, were:

- Difficulties with conceptualisation of the system by new users..
- Maintaining species identification and information gathering in pace with negotiations..
- Handling the quantity of data that was derived.

Individuals new to the method found it difficult to grasp and appreciate. This is, at least in part, a problem of the large numbers of species and complex variables. The first group to use it found it difficult to link data arising from diverse techniques, such as specialist user interviews, participatory plots and market surveys, and to appreciate that the system operates at species, site and resource category level. To understand the implications of each piece of data, and the way specific factors impact on species sustainability, is complex.

It was difficult for species identification and literature review to keep pace with agreement development. This was due to lack of literature at the park herbarium, and logistical problems of visiting other herbaria. Access to conventional literature is a problem facing

context in many parts of the world, where decisions on conservation management are urgently needed, and where funds and trained personnel are in short supply. This method aims therefore to make sound decisions quickly so that programmes can start, at the same time lead into more detailed work to confirm or revise these decisions. This section discusses both advantages and disadvantages of the method, in helping to make these decisions.

4.1.2.1 Advantages of the Rapid Vulnerability Assessment

Species data

The wise use of plants has to be approached at a species level, and there is no substitute to understanding the response of an individual species to utilisation. However, detailed ecological studies do not exist for most species. Through using, for example, life form as a proxy for growth rates and combined with user information, an assessment of vulnerability could be reached and the need for further study prioritised. This method provided sufficient information quickly enough for decisions to be taken at a level of detail that was appropriate for a large number of species. In many conservation situations the lack of resources (skilled manpower and funds) is a major constraint to effective implementation of resource use. This method far reduces the inputs compared with applying detailed ecological approaches for all species. Not only did it allow rapid identification of vulnerable species for use, but also quickly prioritised species for monitoring and research.

The rapid vulnerability assessment therefore performs the role of a "pre-assessment" identifying those species that require detailed ecological research and monitoring. It formalises the selection process to identify species that require detailed research and monitoring. It therefore focuses down to identify critical questions over species identified to be vulnerable. The limited resources available can then be used for more detailed ecological research into answering those critical questions.

As a part of the "pre-assessment" case studies were carried out on two of the species identified to be vulnerable from over use and a highly demanded product used by the communities (See section 3.2.2 for the detailed discussion on the results of these). The

project had relatively few fieldwork days available to establish the resource use programme, being only one of the components of the project. Of the total of 25 days in which teams were in the field 15 were used in the parish workshop on all 57 species and a further 10 were spend on case studies on two of the species identified as vulnerable from the rapid vulnerability assessment. Research and monitoring plots were set up, farmers were interviewed, and the data derived confirmed the decisions of the participatory work. The plots moved towards standard replicated ecological plots, but the sample size was small. To carry out detailed ecological studies on all 57 of the species sanctioned for use, let alone the 100 or so species that were recorded as being used, would demand resources that simply did not exist. The case studies themselves relied to a certain extent on local indigenous knowledge.

Peters (1994) in his field manual for the sustainable harvest of non-timber resources takes an approach complementary to that of the rapid vulnerability assessment of Cunningham but has a different focus. His focus is toward trees (the most vulnerable group) rather than a wider range of plant life forms and in situations of high levels of commercial exploitation within forests, found in South America and Southeast Asia.

Peters defines six steps towards the sustainability of plant resource use:

- Selection.
- Forest Inventory.
- Yield studies.
- Periodic Regeneration studies.
- Periodic Harvest Assessments
- Harvest Adjustments.

Hall and Bawa (1993) suggest a detailed and extensive ecological monitoring approach. This includes series of 10m x 1km long transects where all plant species are monitored in detail. At Bwindi this type of randomised plot were established for biodiversity inventory, for ecological monitoring, and detailed studies on individual species. It was less appropriate for initial assessments of utilised species due to:

many development projects. Most developing country institutions can neither afford to subscribe to, or care for, academic journals. Additionally most development workers do not have the time to track down or even read extensive literature. Ideas are passed, however, much more readily through the "grey literature" networks, both informal and formal and at conferences and workshops[13], although these sometimes lack scientific rigor and peer review. In addition to the problems of access to literature were problems of handling, sorting and storing data. Occasionally data was at risk of being lost. The Development Through Conservation project was in the process of developing an ethnobotanical database. The large amount of species data generated would be useful to other projects establishing the sustainable use of forest resources. It would, therefore, be ideal if the information could be more widely shared maybe through a regional plant use database.

4.1.2.4 Vulnerability factors

Some of the vulnerability factors are more important than others. Life form and parts used, for example, are two of the most important. The part used has a major impact on the vulnerability of a plant to harvesting. A forest tree for example is considered a vulnerable life form under the rapid vulnerability assessment system. This is because trees are generally the slowest growing and reproducing of the plant life forms. Forest trees can, in most cases, tolerate significant defoliation (Maron, 1998; Kaitaniemi *et al.*, 1999), and therefore, if leaves are the part used harvesting is unlikely to have a significant impact. Likewise reproduction, growth rate and the way a plant responds or regrows following a harvesting event, are key elements in vulnerability assessments.

Demand is also a key factor in assessing vulnerability (Bennett, 1992; Cunningham, 1991, 2001). Selectivity of harvest (age, size or quality), seasonal collection, traditional conservation practices, commercial use and the availability of substitutes have a complex interrelationship with each other and the key vulnerability factors (Cunningham, 2001).

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[13] Examples of the formal networks are; Rapid Rural Appraisal Notes - International Institute for Environment and Development (IIED), The Rural Development Forestry Network - Overseas Development Institute (ODI), the Forest, Trees and People Network - Swedish International Development Institute (SIDA) and the working papers produced by many organisations.

Knowledge of these factors will therefore help to fine tune the vulnerability assessments based on the key or major factors. Commercialisation of a species, for example to feed growing urban demand, is likely to change local practices such as seasonal collection, selectivity and traditional conservation practices (Cunningham, 2001).

4.1.3 Participatory rural appraisal

The participatory rural appraisal (PRA) techniques used, which were borrowed from the field of development (Chambers, 1994, 1997,) and Indian Joint Forest Management (Poffenberger *et al.*, 1992, McGean *et al.* 1996), were adapted easily and allowed participation at the community level. The exercises helped to understand the realities faced by community partners in the joint management process. The multiple-use team regularly reported that they were gaining much information from the process, while community members stated how much they had also learned, couching the assessment sessions in terms of 'education'.

The sequence of participatory rural appraisal exercises that were actually used (Figure 10) was particularly important, and this aspect is recognised in the participatory rural appraisal literature (Chambers, 1997). The "fun and relaxed" aspect of participatory rural appraisal is also important, as it helps to build relationships in conflict situations. Trust building is crucial and comes with spending time in communities in an open and transparent atmosphere. Although the exercises were useful for collecting information, we found that there were few exercises to analyse that information and then make planning decisions. On most occasions we used the time honoured and effective local method of sitting under a tree and thrashing out the decisions in open discussion.

Cunningham (2001) warns about the risk of using PRA methods for collecting quantitative data. PRA arose, in part at least, as a alternative to quantitative questionnaire survey of a selected sample of a community with empirical data analysis. Some authors consider that these two approaches should be regarded as complementary approaches (Temu and Due, 1996), while at the same time recognising that they require quite different skills to implement. Concerns have been raised regarding the fact that many participatory methodologies do not address issues such as the exclusion of particular social groups

(Kuhn, 2000) (see section 4.2.12) and that the process has implicit tradeoffs between sustainability and impact (Kuhn, 2000).

4.1.4 Park management advisory committee

As a new institution in 1994, the Park Management Advisory Committee was evolving. Its contribution to resource use was minimal at Bwindi but was more involved at MGNP. At MGNP the committee reviewed and sanctioned the consultative process prior to management plan production. Members discussed crucial resource use issues and made a decision to allow the use of certain water resources within the park. The major problem faced by the Park Management Advisory Committee was the difficulty of communication by the eight community representatives with the rest of the community, especially at Bwindi with 20 forest adjacent parishes and a population close to 100,000 people. Subsequent work at Bwindi and Mgahinga to improve on institutions for park-community-local authority dialogue are described in section 4.2.3.1.

4.2 Components of joint management

I identify joint management as having five main components in addition to scientific knowledge; these are participation, tenure, local institutions, local knowledge and support zones.

4.2.1 Participation

Participation was a key component in the establishment of resource use. The different fora for participation, management plan workshops and resource use parish workshops, as well as the participatory nature of the rapid vulnerability assessment and participatory rural appraisal have already been discussed. Of interest was not only the involvement of the community as a whole but also of the marginalised groups and the limits to participation within the community. It was an aim of the multiple-use team to try and ensure the effective participation and representation of marginalised groups, as well as the community as a whole. During this study the marginalised and hence often poorly represented groups were women and the Batwa. The Batwa were the most alienated group in the communities.

The team wanted both marginalised groups to benefit from resource use. Participation was assessed from attendance records separated by gender with an analysis of the breakdown also by gender of the resource users in the final agreements.

4.2.1.1 Attendance

Levels of attendance were reported in section 3.2.1.1. Participants came and went during the full day parish workshops (c.9am – 4pm) depending on their own work schedules, many having to walk an hour or more to get to the meetings. Therefore the average maximum daily attendance of 49 (range 26-80) was lower that the actual number of participants attending at least part of any one-day's activities. This level of daily attendance was viewed by the multiple-use team as quite acceptable in the local context. And while attendance is only a proxy for participation, it did indicate a reasonable interest in the programme by the community. My own subsequent experience in carrying out similar exercises with coastal communities in Tanzania, where, in contrast, communities attended in much lower numbers and with a lower willingness to spend a large part of the day devoted to this kind of activity. The reasons for better attendance in Uganda this could be cultural as well as the level of dependence on the different forest products.

4.2.1.2 Representation

No detailed gender analysis was carried out in regard to utilisation, however, the multiple-use team felt that the representation of women was acceptable. This was despite the lower numbers of women both attending meetings or being nominated for resource use, being only one fifth to one quarter of the total number of individuals. The reason that the team felt women's participation was acceptable stemmed mainly from the fact that women used the forest less and there was no not sense that women were being excluded from activities that they wanted to carry out because of gender. Representation on the management committees (18%) was lower than the users (25%), but even here this was considered acceptable, and was relatively high given the traditional lack of women participation in decision making. This relatively high profile of women is largely due to the government's RC system, which has encouraged women's representation at all levels of decision-making.

In keeping with the RC systems 'Secretary for Women' at each RC level, women were given official representation in each forest society.

	Rutagunda			Nteko			Mpungu			All Parishes	
	Women	all	women %	women	all	women %	women	all	women %	mean %	range
Forest Societies	6	19	32%	1	29	3%	2	41	5%	13%	3-32%
Stretchers/RC/Abataka	2	4	50%	0	9	0%	0	25	0%	17%	0-50%
Executive	1	7	14%	1	5	20%	1	5	20%	18%	14-20%
Herbalists	1	10	10%	5	16	31%	5	17	29%	24%	10-31%
Basket makers	12	25	48%	4	25	16%	2	22	9%	24%	9-48%
Total Users	**13**	**35**	**37%**	**9**	**41**	**22%**	**7**	**39**	**18%**	**26%**	**18-37%**

Table 26 Number of women nominated in agreements as a percentage of total users

Ensuring the effective involvement in, and benefiting from, the programme by the minority Batwa was much harder and less satisfactory. This was particularly true in one parish where the historic enmity between the two communities, was deeper than in the other parishes. At our first community meeting in that parish, the Batwa sat apart from the main group and it was the multiple-use team that invited them to join in. When introducing themselves they made statements, indicating their weak position in the society and appreciation of being brought into the process, for example:

> "I am glad to be asked my name as I thought we were not considered people. The forest, where we used to get our food, is closed. We have no permanent houses, no places to dig, we are just floating."

They did not attend following meetings, however, and we learnt that other community members had warned them off. We discovered they lived completely separately from the Bakiga, not attending the schools, or members of abataka or engozi, and had no access to education or health care. Much of this deeper than normal hostility emanated from an incident a few years previously when, several Batwa men accused of stealing a goat had been murdered. When questioned community leaders assured the team that the Batwa had been included on the lists of users, but in fact they were not. An influential section of the

community were in fact working towards the exclusion of the Batwa from the multiple-use programme. We considered that it was best not to confront the majority community on this issue of deliberate exclusion of the Batwa, but rather to continue the process as we had much trust to build with them. By the time the joint management agreement was signed, the Batwa women had been included for the collection of basketry materials and the women had a representative on the Forest Society - the first time the Batwa have had any representation within that community. Unsurprisingly Batwa women were seen as less threatening than the men. We felt that, although this level of inclusion was less than ideal, this was a first step, given the hostility and hoped that in time a more equitable arrangement for the Batwa would develop. The inability of many participatory methodologies to address issues of social relations such as the exclusion of particular social groups has been raised as a criticism of PRA (Kuhn, 2000). In our situation we were aware of the problem of exclusion and could contrast the reaction of the different communities. There was some, but limited, ability to influence decisions in favour of a better deal for the Batwa. In the other parishes the Batwa were either more organised or they were better respected and represented, and there were less problems in their participation in the programme. Their situation, however, in society as a whole was not good. As mentioned elsewhere, subsequent efforts by the Mgahinga and Bwindi Impenetrable Forest Conservation Trust to improve their situation has been made with some success.

4.2.1.3 Misinformation and exaggeration

We noticed community members exaggerated certain issues. Where the community had suffered most from the park they overstated their case and with hostility. In parishes where forest closure had a lower impact, and consequently community members were less hostile, they actually understated the situation and the problems from conservation. I interpret this as not wishing to upset park staff in the hopes of greater dividends from the process. Occasionally we were misinformed on technical issues, such as the longevity of certain items, in the hope of a favourable allocation of resources. The misinformation, exaggeration and understatement can be seen as negotiating positions, and sometimes were meant to test the team to judge whether we were genuine, and worthy of the investment of their time (Cunningham, 2001). Triangulation or crosschecking using different sources and methods is one of the principles of PRA (Chambers, 1997). . Having both park rangers and

a local plant parataxonomist on the team was helpful in avoiding some of the pitfalls raised by Cunningham (2001) related to the use of vernacular names. With considerable local knowledge amongst team members, deliberate misinformation was quickly identified and pointed out at gatherings of the whole meeting in a non-threatening and amusing way. As a positive working relationship developed these phenomena declined

4.2.1.4 Decision making and empowerment

As part of its negotiating position Uganda National Parks made some initial decisions about the use of resources. This has been challenged as pre-empting participation, further some workers in the field consider participation or even joint management insufficient and argue for a passing of ownership of forest areas to local communities and this was one of the most serious criticisms of the programme (Watts *et al.*, 1996; Blomley, in press).

The programme was therefore being pulled between opposing ideologies. On the one hand were those, mostly the primate conservationists and biodiversity preservationists, who were very sceptical about allowing any resource use at all and, on the other hand, those whose main interest was in the rights of the surrounding human population, who wanted a fuller and higher level of participation by communities. Uganda National Parks, which was essentially a conservation/biodiversity organisation, as the land managers and decision maker had, however, the most weight, and tended towards a more conservative and cautions position.

The decisions that Uganda National Parks took unilaterally were firstly, to restart resource use, and secondly to decide which resources to allow, or to put on the table for the initial round of negotiations. While these decisions were taken unilaterally, they were taken in the context of community interaction. Communities were making their position very clear by the hostilities to park staff, deliberate fires and political lobbying. UNP was also under pressure from the Forest Department, who argued that equitable management of forests require resource use and the traditional national park model was inappropriate. It should be recognised here that this decision to allow resource use was a significant one, and that the level of resource use within Uganda Wildlife Authority remains the most progressive within national park authorities in the region.

The decisions as to which resource categories should not be on the table for the initial round of negotiations was based on a detailed resource use evaluation involving many of the resource users themselves (Cunningham, 1996). These decisions were based on the perceived vulnerability to over exploitation of the resources. Questions have been raised as to whether Uganda National Parks should have more fully negotiated these initial decisions particularly regarding which resource use categories to allow (Watts *et al.*, 1996). The decision to start resource use cautiously at Bwindi was in part to do with the context as follows:

- A new and potentially controversial activity for Uganda, with very few models to follow.
- The endangered and vulnerable mountain gorilla.
- The high biodiversity and high human population pressure.
- Hostility and mistrust between community and park, previous forest degradation only recently being brought under control.
- Reluctance of a institution used to command, control and exclusion of communities from parks.

Certain dangers were recognised that also affected the decisions:

- Failure at an early stage by being too ambitious could discredit a promising tool among a sceptical scientific conservation and management community.
- Opening old wounds with the community by discussing recently controlled activities that would not be allowed for the foreseeable future.
- Prematurely raising the expectations of the community.
- Starting an activity which would be found later to be unsustainable or unmanageable and then stopping it would be worse than not starting it at all.
- Potential community disenchantment with a process that may not get anywhere.
- Establishing an activity which was beyond UNP's capacity to manage.

Communities wanted access to the forest for some of the resources, not to engage in fruitless negotiations to satisfy notions of participation. We felt that it was important, therefore, to have something concrete on offer before the negotiations began. (see also section 4.4.1)

- Several authors warn that that communities are not monolithic and occur within a specific political and economic contexts, and that the term 'community' itself can invoke a false sense of homogeneity and consensus (Murphree, 1994; Little, 1994). Cleaver (1999) in a critical analysis of participation questions the current wisdom that participation is automatically a 'good thing', and raises concerns including the often assumed unitary view of communities, the simplification of mechanisms of participation (committees) and the lack of recognition often hidden informal mechanisms of participation in prevailing social norms of a society. Additionally she questions the oversimplification of issues related to the power relationships of different players, the low recognition that a community often faces real limits to its own resourcefulness and the danger of swinging from one untenable position (we - the professionals - know best') to an equally untenable and damaging alternative ('they - the community - know best). She calls for a reassessment of the assertion that participation is always both empowering and efficient and suggests that a more subtle analysis is required that recognises the costs of participation and avoids a focus simply on the techniques for improved participation.

4.2.2 Tenure

The tenure situation at Bwindi and Mgahinga reflects the tenure of most protected areas in the developing world (Alcorn, 1993; Poffenberger and Singh; 1996, Stevens 1997). Initially, during the colonial era was the removal of tenure rights from communities and their transferral to the state, with the establishment of the Forest and Game Reserves in the 1930's. Following from this was a slow process of making this new tenure a reality and the gradual removal of settlements and Batwa from living in the forests, which continued into the 1970's. In the 1950's came the indication of the problems of population pressure particularly at Mgahinga, where 10km^2 of the lower slopes of the volcanoes, were degazetted, to allow for an expansion of agriculture and at a similar time greater control

over the harvesting of bamboo. The expansion of the Game Reserve in 1964 at independence may have been a last minute attempt by the colonial government to safeguard the Gorilla populations, however, in the period following independence nothing further was implemented by the Game Department. Following independence Uganda descended into civil war and economic collapse. With the virtual collapse of the state, the forest was only nominally state owned and managed, but approached the open access or no-property situation. This current study did not research this period in sufficient depth to fully understand the extent to which access was open to all. The perception was that it was, however, not totally open access as vested interests were controlling exploitation. Government staff, whose real term salaries had dramatically declined (Howard 1991) were still controlling the forest, but allowing illegal use, which, it was rumoured was sanctioned from above (Tumwesiimire pers.com.). Exploitation was unsustainable and excessive, but there were undoubtedly some rules about who could do what and where, especially for the more valuable resources. For the less valuable resources exploited by local community members there was little restriction. This state of affairs began to be controlled in the mid 1980's when the new government began, through the Game Department, to regain control. This was strongly supported and encouraged by the international conservation agencies, especially WWF, through their research and protection project (IFCP). At this point the ideological debate over "command and control preservation" represented by Game Department and Uganda National Parks and supported by some within WWF and gorilla conservationists and the "use it or lose and community rights" school represented by the Forest Department and others within WWF and some supporting development agencies. The WWF Impenetrable Forest Conservation Project (IFCP), which started in 1986, took in its early years, the former approach, while the CARE International Development through Conservation Project took the latter approach. Mixed up with the ideological debate was a turf battle between Uganda National Parks and the Forest Department regarding the management of the two (and other) forests. In the event Uganda National Parks won the turf battle, not least due to heavy-handed pressure from some of the influential international development agencies. However, the ideological debate swung some way towards the community rights and utilisation, and in this context the recommendation that 20% of both Bwindi and Mgahinga parks could be used by local communities to access resources was important and had policy and legislation implications that are discussed later (see section

4.4.1.1). In tenure terms then Uganda National Parks accepted limited rights of use by local community members, on a pilot basis, to areas within Bwindi Park. This was therefore a softening of the exclusionist/preservationist approach traditionally taken by UNP. Beekeeping commenced in 1993 and the subsequent pilot extractive agreements were then signed in 1994, by the director of Uganda National Parks himself. His personal endorsement was a significant event, as discussed later.

4.2.2.1 State owned or privatisation

Regarding Hardin's (1967) two main options of property management; privatisation or state control, this study indicated the limitations of both. The rates of deforestation at Bwindi (Scott 1992) showed privatisation was not at all an option as this clearly led to destruction of the forest through agriculture and could not bring a conservation solution. The state owned option had largely collapsed during the immediate post independence period, but its revival in an exclusionist form was met with significant community hostility. The compromise option was state control with a component, albeit modest, of communal tenure. This is a variant of the third "post Hardin" tenure option promoted widely in natural resource management (Wade, 1987; Berkes *et al.*, 1989; Feeny *et al.*, 1990; Ostrom, 1990; Ostrom *et al.*, 1999). This arrangement has led to some progress in achieving a stable property regime that supports both conservation and local communities, and promotes some acceptance to, and hence, security of Bwindi Impenetrable National Park.

In effect what was instituted was a regime of land tenure with the state retaining the ownership and the main management responsibilities of the park while giving out rights of harvest from a limited area (20% of the park), and access to particular resources by specialist users on behalf of a larger group of people in very clearly defined community. This community formally takes part in decision making over park management. This then is in line with the thinking of Wade (1987) as described in section 1.3.5.4, and summarised by the following quote.

> "The government can help those local systems by providing a legal framework, and perhaps technical assistance. The legal frameworks should make it possible for local collective action organisations to obtain legally enforceable recognition of their identity and rights within the society, and to call upon the state as an enforcer of last resort." (Wade, 1987).

This kind of tenurial arrangement can be seen as an tenurial niche, in line with Bruce and Fortmann (1989, in and Fortmann, 1993) where the community has usufruct rights over a state owned resource, a very ancient arrangement but new for 'wilderness' national parks.

This new arrangement has required changes to both government and community institutions that are discussed in section 4.4.1.1. As a pilot programme there was no legal framework under which the activity could operate. A legal framework, in part guided by this work (Blomley pers.com.), was established in the new wildlife statute of 1996 (Government of Uganda, 1996). The effectiveness of the state as to continue to play this role, to become the enforcer of last resort and to have the resources to implement such programmes are further discussed (section 4.4.3.1).

4.2.2.2 UWA and centralised state institutional development.

In 1995 the institutionally weak Uganda National Parks and the even weaker Game Department were merged to become the Uganda Wildlife Authority. Despite the injection of significant donor resources this led to a period of stagnation, frequent staff changes, accusations of corruption and general lack of progress within the organisation as a whole (Infield, Mutebi & Blomley pers. com).

The implications for the progress of the Bwindi resource utilisation programme were:

- The new leadership of UWA, most of who came from a 'no utilisation' background needed repeated convincing that the programme was sound.
- The majority of community members from the 15 non-pilot or beekeeping parishes were not receiving the benefits of utilisation.
- Little development of the resource use programme beyond the pilot phase.

Despite an independent review recommending that the programme be extended beyond the pilot phase in 1995 (Bensted-Smith, *et al.,* 1995), UWA did not approve moving into the second phase until 2001. No progress was achieved from similar initiatives at other forested National Parks where pilot activities had been started. During this period of uncertainty, the fact that the former Director of UNP had signed the Bwindi agreements

himself meant that they did have authority within the organisation. Had the agreements been signed locally, which has been argued would make the signing of further agreements simpler, it is likely that they would have been seen as a local arrangement without central support and may have been cancelled. It has been similarly reported that such experimental work the community participation and management of mangrove forests in St. Lucia, would remain limited in scale and applicability, until community participation was effectively institutionalised within state management frameworks (Walters and Renard, 1992).

4.2.2.3 Limitations of the new arrangements

One limitation of state control with a low level of community management is that it has required significant external inputs of resources. And the questions remain (Blomley, in press)

- Will it provide sufficient benefits to buy local and widespread community support to conservation?
- Will it require continued external support long into the future?

What the resource use programme did in the early stages of recent conservation efforts at Bwindi was to help reduce the hostility and engage community members in a participatory process that brought community involvement in establishing the system of sharing park resources.

- It helped to build trust at an important time.
- It helped to return some sense of ownership of the forest by local users

The Bwindi Model then modified the state situation by allowing user rights. In addition there has been the community involvement in decision-making, the sharing of park revenues and grant aid to communities through the MBIFCT, as well as support to on farm substitution of resources and improvements of agricultural practices.

Government Policy has therefore changed in line with recognition of local right to harvest resources. The process of change has been very cautious in the light of the vulnerability of the Mountain Gorilla to human disturbances. At Mgahinga it was even more cautious where, apart from an annual harvest of bamboo rhizomes for on farm planting no resource use is currently allowed.

4.2.3 Community institutions

Institutions are very closely associated with tenure, as it is the institutions that manage the tenure arrangements. The six factors which enhance the likelihood of success of a local organisation from Wade (1987) (see section 1.3.5.4), are repeated here (bolded) followed by a discussion how these are reflect on the Bwindi context and hence the likelihood of success in resource use arrangements.

4. ***The resources.*** **The smaller and more clearly defined are the boundaries of the common pool resource the greater the chance of success.**

The resources at Bwindi are small and boundaries are clearly defined. The forest edge is itself very clear, and this programme attempted to make the boundaries of the multiple-use areas clear, known on the ground and with maps included in the MOU's.

5. ***The technology.*** **The higher the costs of exclusion technology (such as fencing) the better the chances of success.**

Exclusion is very difficult as the forest area is large in relation to the number of rangers there are to effectively patrol. Community leaders (John Tindiwegi pers.com.) have said that the park staff will never be able to keep timber harvesters out simply by law enforcement.

6. ***The relationship between the resources and the user group***

iv. **Location. The greater the overlap between the location of the common pool resources and residence of the users the greater the chances of success**

Resource users live adjacent to the resources at Bwindi. This still means a walk of several hours in difficult terrain.

v. **Users' demands: the greater the demands (up to a limit) and the more vital the resources for survival the greater the chances of success.**

Demand is high, possibly too high and may be reaching the upper limit.

vi. **Users' knowledge: the better the knowledge of sustainable yields the greater the chances of success.**

Resource users at Bwindi, as demonstrated by the case studies and those of Scott (1993), Cunningham (1996) Muhwezi (1997) and Kamatenesi-Mugisha 1997,have a good knowledge of the resources as well as some appreciation of sustainable yield.

5. ***User group***

vii. **Size: the smaller the number of users the better the chances of success, down to a minimum below which the tasks to be performed by such small groups cease to be meaningful (perhaps for reasons to do with the nature of the resources, action to mitigate common property problems must be done by a larger group, if at all).**

At Bwindi the population of beneficiaries can be divided into three distinct groups, users, representatives and the general population of the parishes. The users benefit most from resources use as many of them use the resources directly and then earn income from providing services to other members of the community. The whole community, however, receives the benefits of use, honey, treatments for diseases, access to some baskets and the socially critical stretchers. The third group is the community representatives who have been elected as part of the Forest Societies to manage the multiple-use programme at a village level. Some of the resource users (11% (n=200) of those involved in resource use) were also elected as representatives onto the forest societies. This group of 'user-

representatives' been treated as users for this analysis, as they get the use benefits as a reward for managing the resources use programme. Those representatives that are not users bear the highest burden as they only get the indirect benefits of resource use but have to give their time to management of the programme. Here the incentive to participate may come from sources such as status within the community.

The total population of all three extractive resource use parishes were 14,029 people. Of these only 200 (1.4%) were involved in resource use, either as users or representatives within the forest societies. Resource users (including those who were also elected as user-representatives onto the forest societies) were 0.9% of the total population and non-user representative were 0.5% of the total population. This left 98.6% of the population of the three extractive use parishes not involved in the programme but most of whom were benefiting in some way. The number of direct users would be higher in the beekeeping parishes.

Wade (1987) suggests that the user groups should be small but that not so small that action to mitigate common property problems cannot be effectively carried out. A 'larger' group must do this mitigation. From the preceding discussion it can be seen that as the users are only 0.9 % of the population as a whole the user group is clearly small. However, it is not clear whether the users together with the non using representative are a large enough group not only to mitigate the common property management problems but also to meet the additional requirements laid upon them in the memoranda of understanding in support of the forest and gorilla conservation objectives of UNP. No only this but are the benefits accrued by The 98.6% of the community not directly involved in resources use sufficient for them also to play a supporting role in conservation and desist from other prohibited but potentially lucrative activities. This is discussed in section 4.4.1.

viii. ***Boundaries*: the more clearly defined are the boundaries of the group the better the chances of success**

The additions of Knudsen (1995) under this point are:

6. **The user group should be well defined by itself and others by way of its locale, decent, custom etc.**

7. **It should have legitimate, long-standing claims to the resource.**

8. **Users should be in some way homogeneous, sharing similar traits or identities, or are an interest group.**

In terms of the boundaries of the group this is well defined for the Bwindi and Mgahinga cases. These are largely homogenous groups, which are well defined both ethnically and have lived in these areas for many generations, they do have a legitimate and long-standing claim to have used the forest. The same can also be said of most of the specialist users. Most basket makers and beekeepers have been practicing their crafts for many years and most often taught how to do so by their forbears. The herbalists are well respected, the communities know them and know those that have good reputations.

ix. **Relative power of sub-groups: the more powerful are those that benefit from retaining the commons and the weaker are those who favour sub-group enclosure or private property, the better the chances of success.**

There is no doubt that the land hunger in the area is such that should the forest be allowed to be divided up into private property and cleared for agriculture, this is would happen very rapidly. Likewise the interest groups such as the timber merchants and goldminers who have been powerful in the past would quickly resume their activities. Under the current national and international support to the national park, concessions for agriculture or major extraction (timber/gold) are exceedingly unlikely. The interest of the community as a whole, under this situation of state commitment to conservation, can be seen to be a level of use, participation in decision-making as well as other less direct benefits.

x. ***Existing arrangements for the discussion for common problems:*** **the better developed are such arrangements for discussion of common problems the greater chances of success.**

Prior to the initiatives that are the subject of this study there were no arrangements for UNP and the community to discuss and debate these issues. To move beyond the roles of gamekeeper and poacher, these have had to be developed as a part of the programme.

xi. ***Extent to which users are bound by mutual obligation:*** **the more likely that promises entered into will be kept the better chances of success.**

In these communities community members are bound by mutual obligations some of which are very strong. These obligations are through the Abataka, stretcher societies and to a lesser extent through the RC's. As the forest societies were built on the existing institutions and their mutual obligations, the chances of success should be enhanced.

xii. ***Punishments against rule-breaking:*** **the more the users already have joint rules for purposes other than common-pool resources use, and the more bite behind those rules, the better the chances of success.**

The users do already have mechanisms and rules for social functions such as carrying patients to clinic, solving family problems and funeral arrangements. These operate through the stretcher societies and are very strong with harsh sanctions for rule breakers.

7. ***Noticeability.*** **The ease of the detection of rule-breaking free riders: The more noticeable is cheating on agreements the better the chances of success. Noticeability is a function partly of 1, 3(i) and 4(i).**

Within the community themselves noticeability is high. Very little goes unnoticed, by at least someone, in these tight knit communities. The ability of park staff to detect rule breaking is however lower, with park staff, most of whom are actually community members, being few. They can, however, detect people passing through the forest and detect the evidence of the more damaging utilization. It is likely, that in a case of serious infringements, the rangers would be informed from other community members.

8. ***Relationship between the users and the state.*** **The ability of the state to penetrate to rural localities, and state tolerance of locally-based authorities: the less the state can, or wishes to, undermine locally-based authorities, and the less the state can enforce private property rights effectively, the better the chances of success.**

The Uganda Government, through the Resistance (now Local) Council system, penetrates very far into the rural localities, and is not only tolerant of but also supportive of locally based authority. In fact Uganda has been supporting the development of this local led politics for a number of years.

In summary it can be seen the firstly in the absence of state control of the forest area the population size and economic imperative to clear the forest are too great to be resisted by a common property management group without state support. In the presence of state protection, however, then the users and the communities from which they come posses a number of attributes in line with Wade's (1987) criteria. In helping to establish the institutional arrangements for resource use these attributes have been recognised and built into the resource use management mechanism. The main missing elements which have been influenced by the resource use programme has been through i) setting the size of the user group, ii) through limiting the types of resources used and iii) influencing means of discussing the problems of resource use.

By using the stretcher groups the Abataka and the RC's as the core elements of the forest societies the contributions of these have been ensured. The forest societies began to take active decisions and control some of the illegal activities in their area. They began to resolve issues arising from the implementation of the new structures. For example in one parish the newly elected chairman had expectations of personal gain, and once he realised that this was not forthcoming he lost interest in the position. Other members later elected a new chairman.

The new forest societies needed however to have follow-up and support to enable them to take on critical activities outside the normal village activities such as monitoring resource

off take. By identifying indigenous groups Uganda National Parks had found a constructive way to interact with and support individuals representing the majority of the community.

> "The multiple-use team has worked with communities to develop three Forest Societies, important parish level institutions. This was done through a valuable process of working with and empowering the communities. The strength of the Forest Societies is that they are based on existing community structures ....and thus can be viewed as fundamentally democratic in nature and drawing their strength and authority directly from the people." (Bensted-Smith *et al.,* 1995).

The Forest Societies have, therefore, made park-community communications easier, but have also meant the park authority had to adapt to make communication effective. This was achieved by establishing a new cadre of Community Conservation Rangers (CCRs). The ability of the managing authority to develop the necessary systems and personnel for community participation I see as crucial in developing these new approaches (Wild, *et al.*, 1995). The park staff will need support to effectively implement this new approach.

It is now becoming increasingly recognised that in the field of biodiversity conservation, community institutions have not been given the recognition they deserve.

> "While the depth of indigenous knowledge is now widely acknowledged, evidence from institutional analysis is seldom considered by biological conservationists."(Alcorn, 1994).

Foresters, however, have been working with local institutions for a number of years, for example in Nepal (Bartlett and Malla, 1992; Bartlett *et al.* 1993).

> "Where remnant forests exist, community forestry programs need to look closely for the existence of any local or indigenous forest management systems. These may be well entrenched but unknown to all but the local communities....The underlying principle is to recognise what exists and to use it to the extent that it helps to achieve efficient and equitable forest management." (Bartlett, 1992).

The multiple-use programme in its establishment aimed to ensure that it was appropriately integrated with exiting institutions a point that is also emphasised by Little regarding conservation efforts (1994).

> "Local participation is almost always easier in the presence of one or more local organisations. Working through existing organisations – customary or not – clearly is better than establishing new institutions, which can be extremely difficult." (Little, 1299).

The emphasis on this approach has continued (Berkes, 1998; Hulme and Murphree, 1999,) and the importance of community groups, both leaders and users, in the management of protected areas, is now becoming fully recognised. It is likely that the methods required to work with, support, and increase the capacity of these groups will develop into an important skill area for professional protected area staff.

4.2.3.1 Further institutional developments at Bwindi and Mgahinga

In 1994 the UNP had formed Park Management Advisory Committees at every park, with the objective of interacting with local communities. By the time the MOU's were signed there was no formal link between the PMAC and the Forest Societies. Likewise the district authorities were poorly represented on the PMAC. This left no formal mechanism for interaction between the centrally managed land (national parks, game and forest reserves) and District authorities, especially when a park for example occurred in more than one district. Later UWA formed Parish Park Committees in every parish, which were set up in parallel with the Forest Societies. Likewise other central and local ministries established in new legislation the mechanisms to establish resource user or environment management committees of various sorts. This led to the problem of committee fatigue and overlapping committee responsibilities.

Following a further decentralisation in Uganda in 1997 institutional development became a major focus of the conservation activities at Bwindi (Blomley *et al.,* 1999). This aimed to face key challenges of:

- The gap between local authorities, marginalised park adjacent communities and park management.
- The inter-district planning of centrally managed resources is effected where no formal links between districts exist.
- Local authorities raising issues with central land managing authorities when no formal mechanism exists.

- Raising the concerns of park edge communities with park authorities when these concerns are a low priority for district anyway.

- Integrating protected area planning with wider environment and development planning when this 'gap exist between local and national government.

In an 18-month process in which a thirteen-member ad hoc task force was established, the institutional arrangement were assessed and rationalised and a model was established through a process of stakeholder forums. The output was the establishment of a new institution called the Community Protected Area Committee (CPAC) representing the interests of all the 22 parishes adjacent to Bwindi and Mgahinga parks, across all three Districts. The three districts, as well as UWA endorsed this institution although the latter had some concerns about losing authority, the issue of who pays for the functioning of the committee remains (Blomley *et al.,* 1999).

At the Parish level, after careful consideration of the roles and functions of each, the various official committees including Environment committees (established under the environment statute) the production committee (established under the Local Government Act) and the Wildlife Committees (established under the Wildlife Statute) as well as the informal *ad hoc* Parish park committees, were merged into a single entity called the Production and Environment Committee (PEC). This committee now handles all the production and environment issues within the Parish, having the effect of mainstreaming environmental issues. Forest User groups are represented on the Production and Environment Committee. The effect of this new arrangement is that resource users are now part of a wider legitimate and approved institutional framework that includes links both to the district hierarchy and the national park authorities.

The Forest Societies had a similar function to the Protection and Environment Committees, albeit with a narrower focus which was a) to bring together resource users, RC's and indigenous institution such as the Stretcher Societies within a parish, with the purpose of managing the productive resource use, crop raiding, and balancing environmental sustainability and park concerns. How the Forest Societies officially relate to the

Production and Environment Committees is, however, not clear, and even whether the forest societies still exist and who now manages the MOUs with UWA.

The Production and Environment Committee's do not appear, however, to have taken into account the invisible indigenous institutions, such as the stretcher societies and Abataka. It may be that this was in fact discussed during the consultations towards the establishment of the Production and Environment Committees. During the discussion leading to the establishment of the Forest Societies, there was a sense that the then RC and now LC system linked well with these groups, and in one of the pilot parishes they actually chose the RCs to manage resource use. The literature on resource use and common property resources does however emphasise the importance of these indigenous institutions (Wade, 1987; Knudsen, 1995) and this was recognised as one of the strengths of the resource use programme (Bensted-Smith *et al.*, 1995).

4.2.4 Indigenous knowledge

In recent years there has been much greater emphasis on the collection, preservation and use of local knowledge (e.g. Berkes, 1999) with at least one journal devoted to the subject[14]. Indigenous knowledge has received considerable support in the context of conservation in the Convention on Biological Diversity. In Article 8 the main set of obligations to contracting parties Article 8j states:

> "Subject to national legislation, respect, preserve and maintain knowledge, innovation and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovation and practices and encourage the equitable sharing of the benefits arising from the utilisation of such knowledge, innovation and practices" (Glowka *et al.*, 1994).

During this study large quantities of data were collected from the communities, which greatly assisted decision-making and made a significant contribution to knowledge of the park. Without using this indigenous knowledge the development of the memoranda of understanding would have been very difficult if not impossible. In addition much of the

knowledge has died out in areas far from the forest and joint management should, therefore, help to preserve local traditions through providing access to raw materials and enabling continuing traditions of resource use. A personal realisation was that local knowledge is often very local - an individual's knowledge may just be of the few hills near his or her home - and he or she may be totally unaware of species and practices, which occur in neighbouring areas. One does have to be cautious during the collection and use of indigenous knowledge and Cunningham warns of the dangers of uncritical collection and analysis of local knowledge (Cunningham, 2001).

4.2.5 Zones: a buffer or a support?

Zoning has and continues to be a key practice used in the development and management of protected areas. During this work the parks were zoned and buffer zones established inside and outside the national park. These zones were relatively straightforward with a high protection, tourism and multiple use zones inside the park and a sustainable development area around the park. The word "buffer" and "zone" had negative associations at Bwindi and Mgahinga. The terms agreed in the management plans were "multiple-use zone", where Uganda National Parks retains ultimate authority and "sustainable development area" as the community area under traditional land ownership where Uganda National Parks assists the community. The sustainable development area was defined as the parishes adjacent to the park, the outer boundaries of which vary from 0.5 to 10 km from the park edge. This included the majority of the most affected people, which is 5-6 km from the park edge as identified by the project baseline survey (section 3.1.3, Figure 7). This zoning is the geographical realisation of the principle to protect the core of the park, establish low impact resource use at its edge and substitute high impact uses in the surrounding community lands. The zones were initially identified during the management planning workshops based on the systems approach of Hamilton (Hamilton *et al.*, 1991)(Figure 25).

[14] Indigenous Knowledge and Development Monitor.

The development of joint management of plant resource use at Bwindi has, therefore, followed the broader approach to buffer zones taken by the workshop on buffer zone management (PVO-NGO/NRMS, 1992; section 1.3.6).

> "A buffer zone is an area inside or adjacent to a protected area where the harmonious relationship between the natural environment and the people is promoted." (Brown and Wyckoff-Baird, 1992).

What can be seen is that the objectives and aspects of buffer zones recognised in that workshop are those of what has become known as collaborative management.

4.2.5.1 Who is being buffered from what?

A major weakness of the buffer zone concept is that it was originally designed to buffer the conservation area from the depredations of the community and it still carries this connotation. With a greater appreciation of the reality of the local community situation and the inequity of some conservation measures has come the realisation that the community needs **buffering** from conservation. Given this new appreciation I recommend that buffer zones are renamed "support zones". This then recognises the ideal of mutual support between local communities and the conservation area. The relationship is thus couched in positive rather than negative terms. My definition of support zones, based on Hamilton's systems approach is:

> "Any area, often peripheral to a protected area, and either inside or outside, in which activities are implemented or the area managed with the aim of enhancing the positive and reducing the negative impacts of conservation on neighbouring communities and neighbouring communities on conservation."

This broad definition is closer to the workshop definition (PVO-NGO/NRMS, 1992) but more specific. It differs from earlier definitions (section 1.3.6) that it (a) confirms that zones can be either inside or outside the parks; (b) recognises that park/people interactions can be positive; (c) people need buffering from conservation; and (d) a wide range of activities can induce park/people support and reduce conflict. It should be flexible enough for application to most integrated conservation and development situations. While the term 'buffer zone' has remained the main term in current usage some authors also use the term 'support' zone (Adams and Thomas, 1996).

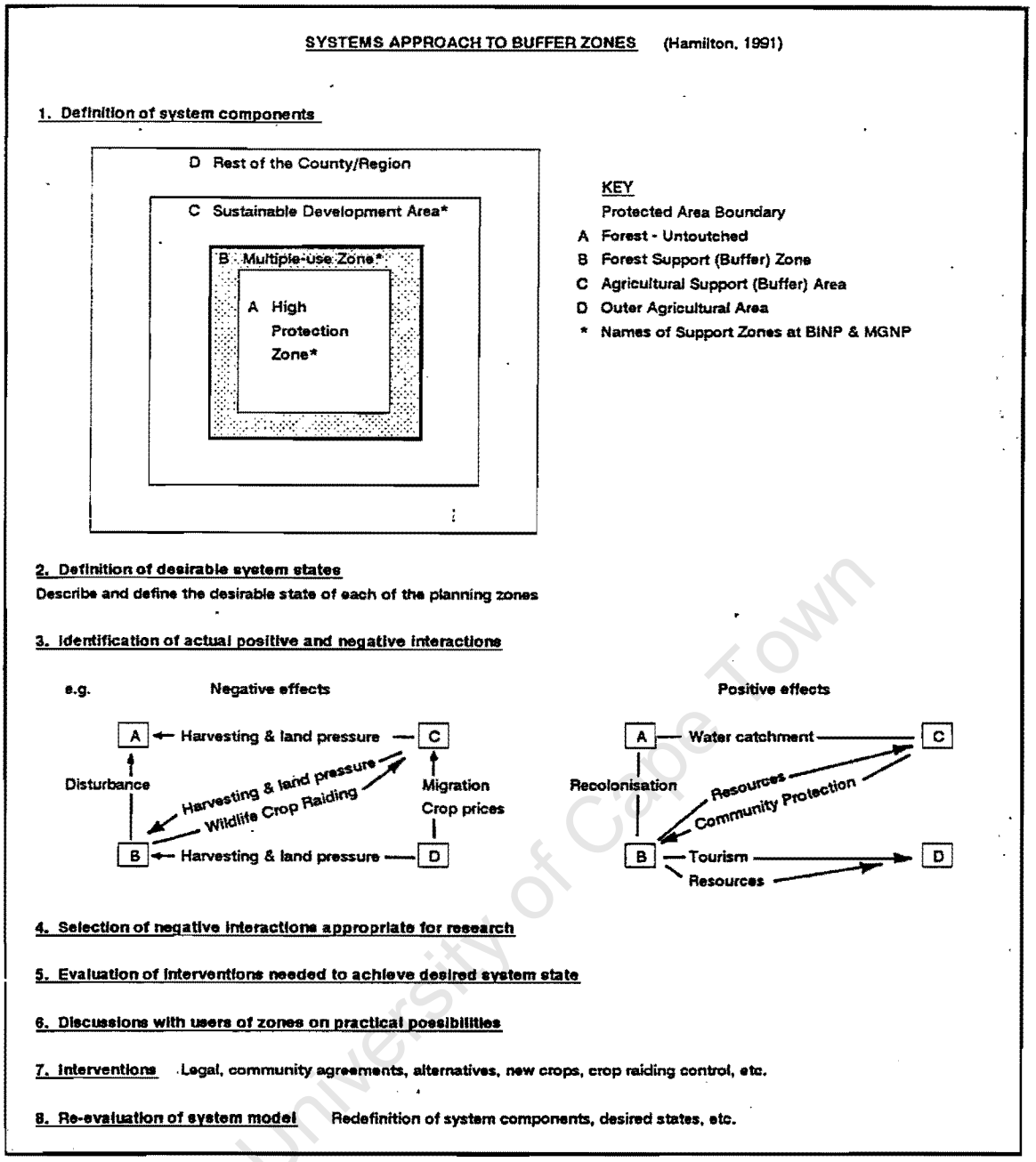

Figure 25 A systems approach to buffer zones.

4.2.5.2 Support zones in Uganda

The criteria for support zone area, shape and activities, as asked by Wells and Brandon (1992), should not have global answers but will be negotiated locally as appropriate to each situation. At Mount Elgon National Park in Uganda, for example, bamboo is found well within the park, and bamboo harvesting zones cannot therefore be peripheral (Scott, 1998). Likewise, the restriction of utilisation to specialist users is not appropriate at Mount Elgon

where key current uses are used by the whole community, and proposed areas are either regenerating encroached land or low diversity/high biomass production vegetation types e.g. bamboo.

4.3 Collaborative management

Having discussed the tools and components used to establish joint, collaborative or co-management, how useful is this method itself as a way of implementing the resource use approach to improving local equity? When the pilot agreements over resource use in Bwindi were signed in 1994 collaborative management of national parks had only just begun in Uganda. Three pilot agreements were signed at Bwindi and the process had begun at several of the nine remaining parks, however, little subsequent progress was made until the year 2000 due largely to institutional changes and weaknesses at Uganda Wildlife Authority. Despite the slow progress in extending resource use indications were that within the pilot parishes, the community were becoming reconciled to the presence of the park and beginning a greater commitment to sustainable land use on their own land. The process had begun to return a sense of ownership in the pilot parishes and a continuing connection with the forest (Bensted-Smith *et al.*, 1995). Although not all attributable to the resource programme this trend has continued (Blomley, in press).

Communication, a crucial part of the process, had moved beyond exchanges between rangers with guns and poachers with spears. The appointment of Community Conservation Rangers who were community members themselves, and the development of the beekeeper associations and the Forest Societies, meant that there is a formal link between the intricate and developed communication networks of both conservation organisations and the local communities (Wild *et al.*, 1995).

Indian joint forest management (JFM) guided collaborative management at Bwindi, but there are significant differences that help to examine whether joint/collaborative management is more widely applicable. In India, Joint Forest Management developed in a context of degraded production forests, whose biodiversity values were reduced to near zero. Joint Forest Management has therefore been in the realm of restoration ecology, protecting seriously degraded forests (Poffenberger and McGean, 1996). The returning to

communities of rights, long taken away by central government, in return for forest protection has halted the degradation and initiated recovery. The success of the Indian joint management has meant that several million hectares of forest are now regenerating, managed by over 10,000 Forest Protection Committees and the Indian Forest Department (Poffenberger *et al.*, 1996). This contrasts with Uganda's three Forest Societies that were established in 1994. However, in Uganda the context is national parks of high biological diversity and integrity. The presence of the disease prone mountain gorillas means that Bwindi is an extremely sensitive site. The higher conservation status has required a careful analysis of the proposed activities, and lengthy negotiations using PRA/action research. In India participatory rural appraisal was not used in the establishment of the Forest Protection Committees, as initially these were established simply for protection purposes, but was used in later research activities. The quantities of NTFPs agreed in Bwindi are very small compared to India where there is unlimited use of these products and hundreds of thousands of villagers using them.

One debating point that has arisen in Uganda has been the use of the word "joint" to describe this collaborative management process (Mutebi, pers.com.). Joint management was taken to mean equal management by UNP senior staff, which was not considered as appropriate within the parks system. Likewise the equal management of out-park land areas by Uganda National Parks would be intensely disliked by local communities and might be seen as park expansion. Uganda National Parks chose to use the term collaborative management. This is also the term that has become the accepted term that is used by IUCN, who have taken a lead on pushing collaborative management forward (Borrini-Feyerabend, 1996).

This discussion as to how far joint is equal has been held in Bwindi and elsewhere (Bensted-Smith *et al.*, 1995; Wily and Othmar, 1995; Carter, 1996). Much of the discussion hinges on the level of empowerment of community institutions in the partnership with government. Several authors consider that joint management is not really 'joint' as government has set the agenda (Sundar, 2000 for Indian joint forest management) and this was a criticism of this programme as already discussed (Blomley, in press). Stevens (1997) recognises an enormous differences in the degree of local decision making

and power that are afforded to the community as governments slowly and often reluctantly hand over some of their centralised power, and considers some initiatives to be token involvement where the real powers lies in the hands of people outside the local communities. He considers that 'true' co-management goes beyond this to where indigenous people become a formal partnership, with conservation management shared between indigenous people and government agencies. This can take the form of and agreement for indigenous people to continue to take full responsibility for the management of some or aspects of local land use management (Stevens, 1997). At minimum he considers that co-management should involve local communities in resource management.

At Bwindi in addition to resource use and management planning, local community representatives participate in an institutional framework, which makes recommendations over park management, and make decisions over the use of the funds set aside for the Mgahinga and Bwindi Impenetrable Forest Conservation Trust. This latter is through an elected Local Community Steering Committee, and by representation on the Trust management Board of which one third of the voting membership is from the local community (3 out of 9). Despite the considerable level of participation Uganda Wildlife Authority holds much of the power.

I consider collaborative management to be a broad approach, able to cover a wide range of tenure and management situations, including ones where government commits itself to the support of development on their own land. I offer the following definition:

> "Collaborative management is the process of collaboration (equitable but not necessarily equal) between local communities and state agencies over the use and management of natural resources or other assets, either state or privately owned, through a process of negotiation which includes all stakeholders, recognises the contribution of each and results in a mutually acceptable and adaptable agreement."

Other definitions discussed in Berkes (1998) are:

> "Co-management signifies [a} political claim [by local people] to the right to share management power and responsibility with the state" (McCay and Acheson, 1977).

> "The sharing of power and responsibility between government and local resource users" (Berkes *et al.*, 1989).

> "The substantial sharing of protected area management responsibilities and authority among government officials and local people" (West and Brechin, 1991).
>
> "A situation in which some or all of the relevant stakeholders in a protected area are involve in a substantial way in management activities." (Borrini-Feyerabend, 1996).
>
> "A partnership in which governmental agencies, local communities and resource users, non-governmental organisations and other stakeholders share as appropriate to each context, the authority and responsibility for the management of a specific territory or set of resources." (World Conservation Congress, October 1996, in Berkes, 1998).

Subsequently, as happens in the development of any new field, specific terms have been evolved to further describe differences in the concepts as they emerge. Therefore in additions to joint, collaborative and co-management other terms such as such as 'shared management', 'community management', "community based management", "participatory management" and indigenous management. Unfortunately new uses of these terms are not always closely defined and confusions often arise. It is especially difficult for government staff, far from the generation of new ideas and pilot project are now expected to implement the new wave of forestry and wildlife policies and legislation (Wily, 2000), based on collaborative management that is sweeping the continent.

4.4 Integrated conservation and development

4.4.1 Resource use

The main objective of this study was to report on and assess the process that was taken to establish resource use at Bwindi, and only indications can be made as to the potential of resource use itself as an integrated conservation and development approach from this study. These indications come from:

- Anecdotal comments during establishment and subsequent visits & observations (pers.obs., 2000)
- The formal evaluation of the programme undertaken in 1995.

- An analysis of fire incidents (Babassa *et al.*, 1999) and illegal activities (gorilla census)
- Follow up studies on resources use.
- Subsequent expansion of the programme

Additionally it is difficult to attribute positive or negative changes in conservation outcomes at Bwindi to the resource programme as separate from the other approaches to integrated conservation and development that have been implemented at Bwindi (this is discussed in sections 4.4.2. and 4.4.3). The following is a list of strengths and weakness of resource use at Bwindi followed by discussion of these, much of which is a synopsis of issues discussed earlier.

The resource use programme had the following positive aspects:

- Allowed access to badly needed resources by the communities
- Contributed to building trust, which has amongst other things promoted increased substitution activities.
- Captured and recorded indigenous knowledge and promoted research into the resources in the park. The knowledge of the park from both types of knowledge has grown dramatically since the programme started in 1991.
- Probably contributed to the reduced incidence of fire and illegal activities since the programme was instituted
- Contributed to the development of institutional arrangements for resource management
- Contributed to the development of national park legislation that is more sympathetic to the needs of local communities.
- Promotion of a connection to and a sense ownership of the forest by local people.

On the negative side is the following:

- High expectations by conservation managers from a small number of direct beneficiaries, and the community as a whole.
- The resources available cannot meet demand.
- It is not a magic solution and problems do not go away, but maybe become of a lesser magnitude. It will not satiate the community demand for resources.
- Needs a long-term commitment and both a capacity willingness to continue solving problems from all parties. It is more complex and subtle requiring enhanced skills from park management, research agencies and development activities.
- It is much easier to start resource use than to stop it, should it prove to be problematic.
- Needs high level political support and is vulnerable without a legal basis.

4.4.1.1 Positive aspects of resource use

Access to resources

A key feature of the programme and part of it reason for being is to provide key resources to community members. In the preliminary studies communities made strong statements regarding the importance of these resources to their livelihoods (Scott, 1992; Cunningham, 1996). No independent analysis has yet been carried out in the pilot areas to assess what value the community as a whole attach to continued access to these resources now that the programme has been going for a number years. However, the key resources have potentially high development impacts. With 86% of the local population suffering from certain parasitic worms (Ashford *et al.*, 1990) the effective worming *Rytigynia* spp. (Kamatenesi-Mugisha, 1997) can have a significant health benefit for the majority of members in a community. This is in the context of a low level of provision of western style medicine in the area (Table 27). In many instances there is no direct alternative

available to certain forest products. In the very long term, however, there maybe a lessening of reliance on local herbs if western medical provision increases.

Area	People per doctor	People per all medical personnel [1]	People per TMP/TBA/ nominated herbalists*
Kisoro district	93,111	1,960	?
Kigezi region	47,148	1,704	?
MGNP SDA [2]	no doctors	no medics	137
Mpungu parish	no doctors	no medics	346*

Notes: 1. All medical personnel, includes nursing aides and dressers. 2 Sustainable Development Area.
Sources: 1991 population census; Turyasingura et al. 1992; Cunningham et al. 1993; UNP 1994a.

Table 27 Comparison of coverage of western and traditional medicine in Kigezi

Trust building

The fact that Uganda National Parks made an initial concession to local communities by allowing limited resource harvesting from a maximum 20% of the area of the national park, was a significant move in UNP's previous position and was in contradiction of the legislation in place at that time. Through the negotiations to restart beekeeping in four parishes and the three pilot parishes for extractive resource, trust was greatly improved (See section 3.4.5). In 1992, during community meetings which I attended, community members were requesting that the gorillas be taken to zoos, and blaming them for their misfortunes. Following the resource use programme in 1994 some individuals from the pilot parishes wanted to see the gorillas as local tourists. These requests would have been unimaginable a few years previously. The resource use programme, helped to build trust at a critical time of the forest's transition to a national park.

Improved knowledge of the resources

The capture and use of indigenous knowledge and the increased science based research in to the forest and its resources have been positive outputs of resources use. There have now been six studies (specific and general) into resource use at Bwindi, and a number of other surveys, questionnaires and reports. It is unlikely that this level of information collection and analysis would have occurred if resource utilisation had not been implemented.

Resource utilisation at Bwindi and Mgahinga, is one of the main relationships that people have with the parks and it is valuable in of itself that this relationship is documented.

Fire control

Part of the hypothesis of resource use is that by allowing resource use it will engender a) a better relationship with the park and local community and b) communities will in turn be more willing to reduce incidents of fire (more self control and more fire fighting assistance) and other illegal activities such as poaching.

Fire has long been considered a conservation problem at Bwindi particularly in dry years (Butynski, 1984). Considerable areas have burnt in the driest years of 1960/61, 1884, 1992 and 1998 (Leggat and Osmaston, 1961; Butynski, 1984; Otim, 1994; Babaasa *et al.*, 1999) (see section 3.1.1.5). Surveys were carried out in 1992 (Otim, 1994) and 1999 (Babaasa *et al.*, 1999) these were compared. The surveys are not carried out in entirely compatible ways the following points (some from Babaasa *et al.*, 1999 and some from myself), however, arose from their comparison.

1. Many more actual fires were recorded in the more comprehensive study in 1999, 37 recorded compared with 16 in Feb – March 1992. However, it is not known whether the 1992 survey comprehensively recorded all fires. It may have, due to its rapid nature (carried out by one individual), either focused on the larger fires and deliberately left or missed small fires.

2. In 1992, 5% of the forest was reported to have burnt, whereas, the figure in 1999 was only 0.8% (2.64ha). The former figure was based on visual estimates of the burnt patches, drawn onto a topographic map and were not measured accurately as the later survey did. The 1992 survey may have overestimated the area burnt. Support to the occurrence of the burning of larger areas in the forest comes from record of at least two individual fires, of the 17 or more recorded in 1983/4, were of about 1ha in extent (Butynski, 1984) These two fires alone being only 0.64ha smaller than the total area burnt by the 37 fires in 1999 (2.64ha).

3. In 1992, 56% of fires lasted in excess of one week and some up to two weeks this also indicates that quite large areas were burnt in 1992. Unfortunately the duration of the fires was not recorded in the 1999 survey.

4. There was a small (7%), but not significant, increase in the numbers fires in which the communities provided help in putting out between the two studies being 61% in 1992 and 68% in 1999 (Babaasa *et al.*, 1999). Given the improved relationships a more marked improvement might have been expected. The 1999 study found that 46% of fires the community participated voluntarily. In 1992 communities helping to extinguish fires were recorded as 'helpful', this was not however an indication whether they had volunteered to be helpful, which was not recorded. From discussions at the time many did had to be persuaded to help, and there were reports of them restarting fires deliberately (Otim pers.com.).

5. Possibly the most telling difference between the two surveys was the fact that 31% of the 1992 fires were considered to have been arson while none in 1999 were recorded as such.

While not conclusive, the data between the two fire surveys and earlier information does indicate an improvement in the fire situation. The areas burnt in1992 (and also in 1983/1984) seems to be larger and the fires are likely to have burnt longer in 1992 than in 1999 despite the fact that 1999 was a drier and a more serious drought than in 1992 (Babaasa *et al.*, 1999). There was significant voluntary participation in 1999 although the increase in overall community support (voluntary and/or coerced) over 1992 was only modest, and not significant (Babaasa *et al.*, 1999). It may be that with the smaller fires in 1999, park staff had less need mobilise the community to assist with extinguishing the fires and this may have been recorded as the community not helping. In regard to the relationship between park and community, however, is the fact that incidents of arson dropped from 31% of the 1992 fires to zero percent of the 1999 fires.

Like wise the situation is not very clear in relation to beekeepers. Beekeepers caused 25% of the fires recorded in 1992 and in all cased helped put out the fires, whether willingly or

not. In 1999 beekeepers were recorded in starting only 11% of fires but only helped putting out half of those fires. It may be again if the fires were small and discovered early the park staff did not need to ask for assistance. One of the Batwa specific resources is honey from *Trigonid* (stingless) bees, which they take from natural colonies and thereby destroy the colony. In the analysis of causes of forest fires in 1999, 24% (9) were started during honey harvest from trees, most likely of trigonid bee colonies. These represent 60% of the fires that started in the forest. (N.B Most fires, 59% (22), started from agricultural burning outside the forest).

> "All the fires in the Rubuguri/Rushaaga areas were caused by honey hunters save for only two ... As if by coincidence it is at the boundary of these areas that the Batwa reside, therefore, one may be tempted to think that they are responsible for these fires." (Babaasa *et al.*, 1999).

The report recommends that the Batwa could receive special education related to fire and honey harvesting. While honey harvesting remains illegal this may not be politically possible, however, limited hunting may be justified on cultural grounds.

Fire monitoring is one of the more important indicators of success of the community conservation approach It is important, therefore, that fire monitoring continues in each dry season, with more details of attribution particularly in relationship to multiple-use. It will be important to record more details about community assistance, whether it was requested, what the response to the request was, and how many fires the community put out alone without the input of park staff.

Illegal activities control

By their very nature illegal activities are hard to analyse, not only is getting accurate information difficult but changes in records of illegal activities can be attributed to contradictory causes (a reduction of reported infractions could be due to, for example, a reduction in patrol effort or a reduction in actual infringements, (Adams and Infield, 2001)). During this study an attempt to analyse some of the patrol records kept from 1989 to 1994 was made. This proved difficult, however, as no record was made of patrol effort. An improved infraction recording system was instituted at this time but analysing the results of this was not possible as part of this study. A reduction of actual illegal activities

in Bwindi is indicated, however, by a data colleted on human activities during a census of the gorilla population undertaken in 1997 (McNeilage *et al.*, 2001). During the census fewer snares were found than in the survey of Butynski in 1984, and far fewer than in the Virungas

> "Butynski (1985) found 89 snares while walking around 200km of survey, with only one or two guides, whereas 62 snares were found in over 500km walked during the 1997 census, in which many more people participated.....Although 62 snares were found during this census of Bwindi, 414 were found during the most recent census of the Virungas in 1989 (McNeilage, 1995), where similar methods were used. Hunting sign was therefore much lower than was the case in the Virungas."(McNeilage *et al.*, 2001).

Based on this data and assuming some comparability of the surveys these figures represent a 72% reduction in the snare encounter rate per km of survey trail from 0.445 snares/km in 1983/84 to 0.124 snares/km in 1997, including a probable increase in search effort in the latter survey (larger teams). The 1997 survey also found double the encounter in the 14 interior sectors (0.14 snares/km) than in the 20 exterior sectors (0.07snares/km), although the difference was not statistically significant. The total human disturbance sign was not different from internal and external sectors. McNeilage *et al.*, (2001) concluded that snares and other signs of poaching did not seem to have had a negative impact on the distribution of gorillas in Bwindi, although gorilla distribution was negatively correlated with other forms of disturbance. They felt that this did not necessarily imply a causal relationship, the reason why gorillas use the interior more than the exterior being currently undetermined. They speculate that the response of the gorillas to the heavy human disturbance in the late seventies and early eighties may have left a residual pattern in the current gorilla use of the forest.

No analysis was made of a comparison of the number of human disturbance signs that were recorded inside or outside the multiple-use areas. While it was noted that most of the beehives were inside the multiple-use areas. It would be most useful to record whether a disturbance sign illegal or illegal was made inside or outside a multiple-use zone, and if outside how close was it to a multiple use area. During the debate whether to establish multiple-use zones contradictory arguments were put forward related to illegal activities. Proponents of multiple-use argued that multiple-use would contribute to a reduction of illegal activities, while opponents argued that resource users would use the legitimate

access to the forest to carry out other illegal activities, for example licensed beekeepers would set snares while attending their hives. It may it is also possible that lawbreakers may deliberately avoid the multiple-use zones passing deeper into the forest to avoid detection. Recording their the location of disturbance to the multiple-use zones will help to monitor both the compliance to the multiple-use agreements and to the overall park regulations.

While there is good evidence of an overall reduction of illegal activities at Bwindi it is currently impossible to attribute this specifically to multiple use. Resource use had been going on in 31% of the parishes for about three years when the census was undertaken. The MOUs gave clear responsibilities to the Parish communities to control illegal activities (Table 28), but the impact of this compared with the other programmes, particularly park patrolling and revenue sharing and the Bwindi Trust is hard to say without further analysis. It is my own feeling that patrolling will have had the most significant impact and that multiple-use, revenue sharing and the trust will have played a supporting role. At Mgahinga the incidences of illegal activities have also declined to an unusually low level (Adams and Infield, 2001). A resources use programme was proposed for Mgahinga (Cunningham *et al.*, 1993), which aimed to promote both use and regeneration of the areas farmed for 40 years (communal planting and use of bamboo, and beekeeping areas), as part of a multiple-use zone that covered 20% of the park, which was established within the management plan (UNP, 1996; Figure 9, section 3.1.3). This programme has yet to be fully implemented and by early 1998 consisted only of the annual harvest of bamboo rhizomes for on farm planting that had started in 1994 and the proposed placing of beehives into the multiple-use zone (Adams and Infield, 2001). The reduced illegal activities at Mgahinga in the absence of a significant resource use programme may indicate that conservation is successful with out this element. Part of the reason for this may the effective water scheme which pipes water from the park to a significant number of households. Residual resentment seems higher and conservation successes more fragile, however, at Mgahinga (Infield and Adams, 1999, Adams and Infield, 2001) than at Bwindi (Worah *et al.*, 2000).

The killing of gorillas themselves has, at Bwindi, been an unusual event in contrast to the Virunga Volcanoes (McNeilage *et al.*, 2001). In March 1995, however, four gorillas were killed in Bwindi Forest in an area far from the pilot multiple-use parishes. Community

leaders vehemently condemned these killings during parish meetings of an independent review of the Bwindi resource use programme (Bensted-Smith *et al*, 1995). In one of the multiple-uses parishes it was asserted that if the poachers had come from their parish they would not have escaped. In another multiple-use parish it was stated that gorilla poaching is a big person's business, organised outside, so that there is little that the local communities can do to prevent it (Bensted-Smith *et al*, 1995).

Development of institutional arrangements

Issues related to institutions were discussed in section 4.2.3. The main point in relationship to resource use is the fact that resources use is one kind of activity where the intuitional arrangements are necessary as a mechanism for the self-control of the behaviour of both resource users and the community as a whole. This can be seen both positively and negatively. It is positive in the sense that resource use puts in train activities that support the development of institutions for environmental management. The negative element is that this work is demanding and requires considerable inputs. Institutional arrangements are however essential for the effective management of natural resources and the Development Trough Conservation project has made significant investment in this area.

National park legislation

In 1995, a new legal National Parks statute for Uganda Wildlife Authority allowed, for the first time, consumptive use of park resources. This is currently the only national park legislation in East Africa, which allows this. Undoubtedly, the resource use programme at Bwindi has contributed to the development of this as did work at other parks (Scott, 1998; Infield and Namara, 2001). Each was implemented slightly differently and the Bwindi model is the one still followed by UWA (Blomley pers.com.). Therefore a positive output of the programme was its contribution to progressive legislation that allowed resource use from within national parks in Uganda.

Sense of ownership by local communities

Over and above any economic benefit, resource use allows a sense of ownership of the conservation programme. This was clearly articulated by a number of resource users when they started to re-use the forest after the period of exclusion.

Complex, knowledge built up.

Resource use is, however, a more subtle approach to conservation, resource management and interaction with forest adjacent communities. Significant knowledge about the protected area can be gained in the process.

4.4.1.2 Negative aspects of resource use

Compliance with the resource agreements.

Shortly after the beekeeping was restarted some beekeepers were caught setting snares. They were cautioned by the beekeepers societies. In the 1997 gorilla census encounters with beehives were the most common form of human activity. Of these 14 (15.8%) were outside the established multiple-use areas. No indication was made in the census documentation whether these were actively managed hives. When beekeeping was re-established the areas agreed were smaller than the area where the beekeepers had originally set their hives. Some were moved back into the multiple-use zones. The fourteen hives recorded outside the multiple-use zones could therefore be either illegally maintained hives or abandoned, left from the earlier phase of beekeeping under the forest department (they can be very long lived).

The most serious indication of lack of compliance comes from the study of *Rytigynia* spp. of Kamatenesi-Mugisha (1997). She recorded lack of compliance with the MOU's over three areas

1. Exceeding the quantities agreed.

2. Exceeding the number of nominated herbalists.

3. Harvesting outside the agreed multiple use areas.

Kamatenesi-Mugisha (1997) found from harvest records that while 3.5kg were agreed in Mpungu Parish, 6.13 kg had actually been harvested after 8 months (07/94 – 02/95), 2.6 times the pro rata monthly harvest amount agreed. In Nteko 4kg/yr were agreed but 18kg had been harvested after only 6 months, a worrying 9 times the agreement. Further records for Mpungu from 09/95 to 04/96 showed a reduction in the rate of harvest (records for 03/95 – 08/95 appear to be missing). In this latter period of four months the monthly harvest was 0.31kg/mo, a reduction from the 0.77kg/mo for the first 8 months, but still slightly in excess of the 0.29kg/mo agreed upon. This reduction may have been an adjustment in response to the earlier over-harvesting.

The actual numbers of herbalists nominated to harvest *Rytigynia* spp. were also exceeded from the 23 nominated to 28 (Mpungu 14+3, Nteko 9+2), representing a 22% increase in harvesters. The increase in harvesters would account for a small part of the increase in harvest. Additionally while she found no harvesting outside the Mpungu Multiple-use areas she found a small amount of harvesting outside the Nteko multiple-use areas. This species represent probably the single most important benefit to communities from the multiple use programme. A full evaluation of compliance with the resource agreements is needed.

High expectations of conservation management from a small number of direct beneficiaries.

One of the major criticisms of the resource use as established at Bwindi is that the expectation of the roles and responsibilities that were established in the MoU's were high in relation to the products that were being accessed. This needs to be evaluated in more depth.

Table 28 Responsibilities established in Memoranda

Responsibilities of UNP
Allow resource user to access resources
Allow general public to use footpaths
Identify areas for resource use
Issue resource users with identity cards
Assist the community on farm substitutions of resources and improve agricultural support
Allow chasing of problem animals accompanied by park staff
Responsibilities of Community
Abide by the park by-laws
Follow rules aimed at minimising disease transmission to mountain gorillas
Not to start or allow fires to enter the forest
Collect only the amounts agreed, for use or sale only within the community
Report on observed decline in resources
Minimise illegal activities occurring in the multiple-use are or nearby park areas and Maintain records of the illegal activities

Some resources cannot meet demand.

Some of the resources (e.g. *Rytigynia* spp.) cannot meet the demand therefore there is the pressure for expanding the programme. A programme such as this, however, needs to be accompanied by an active resource substitution programme, to mitigate the shortfall in demand.

It is not a magic solution and problems do not go away, but maybe become of a lesser magnitude.

Problems tend to be replaced by lower order ones, and realising the fundamental difficulties that adjacent communities face, it is not surprising that once a request is granted it is followed by another one. Following the resumption of beekeeping at Bwindi, and the subsequent reduction of fires, the beekeepers requested to be allowed to cut trees particularly *Faurea saligna* (omurengyere). *Faurea saligna* produces a very durable (longevity of up to twenty years) traditional hollow log hive, and beekeepers wanted to replace old and rotten hives. Uganda National Parks did not want to allow this as it broke

the principle of no tree cutting. However, Uganda National Parks was and now Uganda Wildlife Authority is duty bound now to try and find an alternative hive for use in the forest. While it seems the threat of fires is reduced the parks authorities have the challenge of finding cheap, chimpanzee proof, hives. The replacement hives became an issue often raised at community meetings. On one occasion, during this study, when discussing replacement hives with park rangers the question was posed, what would happen if the park could not find a solution to the hives and stopped beekeeping tomorrow. The reaction from the rangers was very strong, unanimously saying the beekeepers would, in anger, set fires and the forest would be burning within one day. So despite the difficult issue of replacement hives, beekeeping as an activity is itself greatly valued and terminating it would be very unpopular. The reaction of the rangers brings home another point. This is that these activities should not be started unless there is reasonable confidence that they can continue for a considerable time. Should they need to be reduced or halted this must happen through negotiation over an appropriate timeframe and not stopped suddenly. To fully gain the support of the community, continuing efforts will need to be carried out to solve these lower order problems. The Development Through Conservation project for example began to support the Bwindi Beekeepers Association (the user group that the beekeepers had formed). This support took the form of supplying *Faurea saligna* seedlings for on farm planting, a trial of alternative hives, and training in honey processing and marketing to gain added value to Bwindi Honey. The multiple-use team also planned an evaluation of *Faurea saligna* to assess its potential to supply hives from the forest. This outside support may be crucial as among the priorities that UWA faces, replacement hives, is likely to be very low on the agenda.

> *Needs a long-term commitment and both a capacity willingness to continue solving problems from all parties.*

It is certainly clear from the above discussion, that this kind of programme should not be taken on lightly but requires the long-term commitment of the different players to continue problem solving.

It is more complex and subtle requiring enhanced skills from park management, research agencies and development activities.

Park managers and law enforcement staff have to be subtler in their approach (c.f. community policing), and must be able to respond to calls from communities for assistance, which is still a complaint from communities at Bwindi (Worah *et al.*, 2000). Community conservation staff need good communication and community interaction skills, which need to be supported through a community conservation network in the park service. Research agencies also need to be able to support resource use through ethnobotanical and substitution research and monitoring and support communities and park staff to play their respective roles. Furthermore work with communities in the sustainable development area needs continued inputs. This is neither the role of the park authorities or of the research institutions and is currently carried out by the ICDP support. While funds for these activities may be forthcoming from the trust fund on a sustained basis, there may not be the institution to support them beyond the life of the DTC project.

Needs high level political support

While the pilot resource use programme contributed to the development of new legislation on resource use, it was itself vulnerable, in the initial stages, to a lack of legal basis. The five year delay in approving a continuation of the programme largely was the result of the institutional changes occurring within UWA (Infield pers.com.), with incoming staff taking time to accept the programme, despite being covered by legislation. The fact that the former director personally signing the first agreements was very important in signalling acceptance amongst senior levels within the institution.

On going commitment, difficult to reverse decision unless everyone agreed.

Resource use requires a long-term commitment from institutions that manage it and may depend on the level of enthusiasm of protected area agencies (Infield and Adams, 1999). It is not a quick fix solution to a relationship problem, and demands capacity to manage well. It is difficult to stop once started (Infield and Adams, 1999) and it may be better not to

allow use than stop it after it has been started, as this will become difficult to do unless negotiated by all parties and mutually agreed upon.

4.4.2 Substitution

Substitution activities are a key part of the "protect, use and substitute" strategy adopted for this study. That is, protection of the core forest, the low impact use of the peripheral forest, and the substitution of high impact uses by on-farm production. While substitution has not been the subject of this study some details of the substitution activities carried out will help in evaluating this "use and substitute" strategy (Figure 26). The use of timber, beer brewing boats, building poles, bean stakes and firewood was still prohibited by Uganda National Parks, but on-farm substitution of these products was the focus of a tree planting campaign, which was a key activity of the Development Through Conservation project. The project has carried out general plantings of exotic species, the promotion of indigenous species and specialist substitution. While tree planting was initially resisted and slow to begin, it gained momentum. Over a million seedlings had been planted for the five years from 1988 (Kisakye, 1993). This figure, while modest, is conservative as it excludes records from extension staff that had left the project prior to 1993.

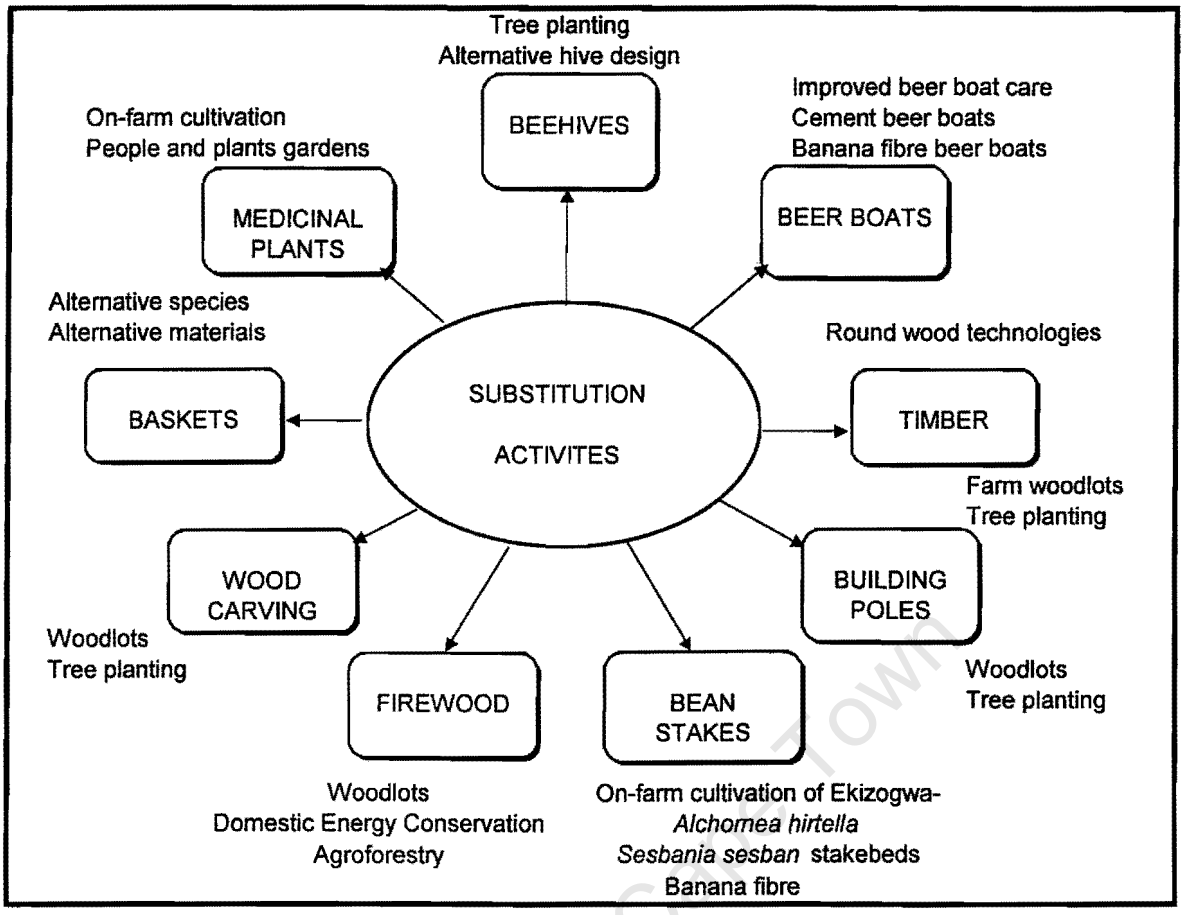

Figure 26 Forest products needing substitution, and substitution activities

In the first six months of 1994 over four thousand indigenous trees from Bwindi were planted on farms. Specific substitution activities include for example densely planted *Sesbania sesban* (Omunygayegye) for bean stakes and propagation of medicinal plants. The tea industry was approached to assist in reducing the demand for tea baskets by using collection nets or plastic baskets. An alternative plucking basket was developed by farmers in Mpungu using *Dodonaea viscosa* (Omushambya), a shrub common on fallow land (Photo 15).

It has seemed that resource use has promoted a greater willingness to carry out substitution activities on people's own farms. The initial resistance to tree planting was almost certainly part of the resistance to the park establishment. From early on in the project (1988) there were persistent rumours amongst the community that once the Development Through Conservation project had succeeded with tree planting and agroforestry the resulting treed landscape would be annexed to the Forest Reserve and then National Park. Once negotiations began regarding the allocation of the multiple-use areas these

community fears began to subside. Resource substitution activities were identified as a Forest Society objective during the negotiations leading up to resource use, and the improved relations with the park has meant a greater willingness to consider on farm resource planting. Individual resource users have already shown an interest in cultivating medicinal plants. Tea farmers have petitioned the tea company for alternative baskets and Institute of Tropical Forest Conservation is working with community groups to produce baskets from shrubs growing on farmland. The Institute of Tropical Forest Conservation and the Development Through Conservation project were collaborating with ICRAF to propagate indigenous trees in large quantities.

One problem facing effective resource substitution is that it may not receive the attention it needs to fulfil the strategy of "protect, use and substitute". If this part of the equation is weak, then resource use initiatives may be jeopardised. Substitution interventions can requires even greater research capacity to find solutions to specific problems. While few problems have no solutions, each solution may take considerable development. While potential solutions to the problems of replacement beehives, beer boats and tea plucking baskets were identified, little progress was made due to lack of manpower and time. Without attention given to these activities the communities are left without solutions, which over time could undermine the whole scheme. While important to communities these issues, as already mentioned, are not likely to be the priority of either the protected area authorities or biodiversity research institutes.

4.4.3 Other approaches to integrate conservation with development

Due to the risks inherent in resuming, albeit limited, use of the forest, the question has been asked; are there more appropriate integrated conservation and development approaches than resource use? Sharing ecotourism assets, and the promotion of community development as well as the already discussed substitution of park resources are the main other approaches currently being used. While protection alone is not strictly an integrated conservation and development approach it is also worth revisiting as an alternative.

4.4.3.1 Protection only

In the absence of community support protected areas are faced with a long-term war of attrition with hostile communities. When this "war" at Bwindi and MGNP was at its worst, communities at both parks, targeted rangers who are locals themselves. They were physically attacked, refused the sale of food, falsely accused of rape and even refused ambulance and burial services, serious sanctions in these tight knit communities (Figure 23). Accompanying the deep dissatisfaction with the parks is the risk of reoccupation. During the campaigns before national elections in June 1993, politicians at MGNP promised that the park would be given back to the people. The risk is particularly great at times of institutional or national upheavals, which sadly, are not uncommon in the region.

Community members often made open threats to the gorillas at Bwindi, when the hostilities were extreme. During this period the gorillas symbolised the problems community members faced from conservation. The most extreme case of conservation related gorilla sabotage came from the same forest area as Mgahinga but just over the border in Rwanda. In the west Dian Fossey has become the epitome of the dedicated conservationist, with a conservation foundation named after her. There is, however, another aspect to the story, as related by Adams and McShane (1992).

> "After the death of her favourite gorilla, Digit, Fossey stepped up her campaign of what she called "active conservation", others called it '"confrontational conservation". She intimidated the local people and waged a psychological war with them. This had the effect of making some Rwandans her sworn enemies. Most of the gorillas killed by poachers from 1978 on were the ones in her favourite study group. The poachers specifically sought out these particular gorillas, waiting for a time when they knew no researchers would be around before killing them. The poachers were sending a clear message to Fossey, and it was now equally clear that she had become a major threat to the gorillas' survival." (Adams and McShane, 1992).

From the earlier analysis of the costs borne by local communities (section 3.1.1) it is easy to see why they are hostile to conservation. The communities will wage a war of attrition, and at moments of government weakness destroy or reoccupy the parks. I do not consider the conservation of parks by aggressive protection to be a long-term sustainable option. In making this statement, I do not assert that law enforcement and protection are unnecessary. On the contrary law enforcement remains an essential part of protected area management,

and continued protection was required at Bwindi. This has been recognised by others (Sayer, 1991; Wells *et al.*, 1999). In Indonesia Wells *et al.* (1999) found that the extent to which the effective enforcement of laws and regulations is a basic requirement for a successful integrated conservation and development project was deeply under appreciated. Under resource use, however, the enforcement has to be more sophisticated, subtle in its approach, reasonable as opposed to aggressive, negotiated and ideally participatory (section 3.4.1). In fact it is important that the state retains the capacity of the enforcer of last resort (Wade, 1987). If community members report on infringements on the multiple-use programme or park laws in general and no action is taken there is a strong disincentive to continue to report on illegal activities. There were repeated complaints of this nature during the establishment of resource use at Bwindi and they still arise (Worah *et al.*, 2000).

There has been considerable polarised debate concerning the role of protection in protected area management. This debate has been described as part of a 'narrative' and 'counter narrative' by Adams and Hulme (2001), using the terms 'fortress' conservation for the narrative and the new 'community conservation' for the counter narrative (which includes ICD approaches). Over the last decade the counter narrative, of which this study is a part has enjoyed considerable success and is now the dominant policy across Africa and elsewhere (Hulme and Murphree, 1999; Adams and Hulme, 2001). A number of authors consider that this counter narrative has actually led to a failure of conservation, in closely linking it with economic development. In part they feel this approach has led to the abandonment of basic wildlife protection and is at least in part the cause of some of the ongoing destruction seen in some areas (Oates, 1999 for West Africa, Terborgh, 1999 for Latin America). Concerns have been raised over the abandonment of game laws (Spinage, 1996), which has been recommended by some (In Adams and Hulme, 2001). In my experience, law enforcement is necessary and abandoning it will not help conservation. Neither will a return to aggressive law enforcement and the exclusion of local communities. A more realistic combination of the narratives is advocated by Hulme and Murphree (1999).

> "In truth what is emerging is a 'new conservation' that both challenges fortress conservation and works alongside it. This new conservation is a much looser construct than fortress conservation and the ways in which the concepts on which it is built interrelate demand careful consideration both for theory and for practice. I

> is not a simple case of 'out with the old and in with the new." (Hulme and Murphree, 1999).

The authors reveal that community conservation is not a quick fix. It is also recognised that an integrated conservation and development project is only really effective where local communities are the main threat to a conservation area, and that the national government is largely supportive of conservation aims. When conservation threats come from external influences (e.g. national or international logging), where local communities have little say in the activities and central governments are either weak or actively promoting exploitation through strong commercial interests, a community focused conservation and development project is likely only to have limited if any impact (Wells *et al.* 1999; Brown, 1999).

4.4.3.2 Ecotourism, revenue sharing and community development

Tourism revenue sharing and community development cannot easily replace resource use as a means of benefit sharing, at least not in the short term. They take long to develop and the benefits are uncertain. Resource use cannot likewise replace tourism revenue sharing or appropriate development, as not all uses will be allowed. The different approaches to improving local equity are complementary rather that exclusive of each other. The development of the Mgahinga and Bwindi Impenetrable Forest Conservation Trust has made a significant contribution to conservation of the two forests. It has provided a level of sustained financial input into the conservation of the two parks that is the envy of most protected areas. These inputs have been able to promote a considerable amount of basic health and education infrastructure amongst villages adjacent to the two parks. It has also been able to support resource use, monitoring as well as park management (pers.obs.) .

4.4.4 Linking conservation with development

Finally, one of the recurring criticisms of the integrated conservation and development paradigm, which aims to promote local equity in biodiversity conservation, has been problems in linking the development activity with the conservation objective (Wells and Brandon, 1992; Brown and Wyckoff-Baird, 1992; Kremen *et al.*, 1994). During this study I developed a framework for linking development with conservation. This involved the examination of the costs incurred by local communities, converting these problems to

integrated conservation and development objectives and then developing the appropriate development activities and interventions to deflect the problems and achieve the objectives. Figure 27 shows the summarised problem tree from Figure 5, with the activities to achieve integrated conservation and development objectives relevant to the national parks in southwest Uganda.

4.5 Ethics: sustainability and equity

4.5.1 Sustainability

4.5.1.1 Types of sustainability and their interrelationships

Due to the debate over the use and abuse of the word "sustainable", caution over its use needs to be exercised. One of the recommendations from the debate on sustainability (section 1.3.6) was to define sustainability in each case. I have recognised three types of relevant sustainability (ecological, institutional and social) and defined the way the word is used in this context. The institutional and social definitions are my own, and have a narrow focus towards resource use.

Ecological sustainability: Use that does not reduce the future use potential, or impair the long term viability of either the species being used or other species: and is compatible with the maintenance of the long-term viability of supporting and dependent ecosystems (IUCN, 1993).

Institutional sustainability: The ability of community and government institutions to sustain both conservation and other obligations in the collaborative management agreements and to ensure the compliance of each other.

Social sustainability: The sustained social value of the small quantities of forest products harvested that is sufficient to maintain community interest in continuing collaborative management with park authorities.

The economic value of the harvested species is extremely low, at least in the conventional economic sense (Bensted-Smith *et al.*, 1995). Despite this, the value of being able to maintain a continuing relationship with the forest should not be underestimated. Access to the mineral springs (Photo 11), the ability to replace the crucial stretchers, or be treated for common ailments cannot be measured simply in monetary value. Hence the term "social value" has been given to these products and can be considered part of the increasingly important concept of social capital. Economics however may be of greater importance than is realised in these communities where cash is not used in many economic transactions, and where even a small amount of money can go a long way. Economic sustainability may therefore have to be considered in the long run.

Using these definitions a number of points can be made.

- Ecological sustainability is dependent on social and institutional sustainability.
- Institutional sustainability needs to be maintained and monitored by the other party. Who is responsible for holding institutions to account for their part of the agreement?
- Overall sustainability will be enhanced if resource use has been appropriately established.
- Monitoring as laid out in the agreements needs to be effective.
- Institutional sustainability will be affected by many factors outside the control of the community or the management authority.

A number of measures have been taken at Bwindi to maximise ecological sustainability.

- 80% of the national park zoned as high protection area with no resource use.
- The proscription of high impact generalist uses such as timber, poles, firewood, bean stakes etc.
- Only permitting low impact specialist use of medicinal plants basketry and low impact generalist beekeeping.
- The cautious establishment of 3 pilot extractive and 4 beekeeping areas to test use.
- Using community leadership to nominate reliable users.

- Monitoring of off take of all harvested species and subsequently the establishment of comprehensive ecological monitoring programme by the Institute of Tropical Forest Conservation.
- Setting of extraction rates of most species well below their potential based on the rapid vulnerability assessment methodology.
- Identification of vulnerable species and the establishment of monitoring plots for these.
- Establishing procedures to minimise interaction with rare primates.

Factors affecting institutional sustainability from the community side include community cohesion, and the identification and enabling of local decision making structures. Communities will need support to increase their institutional capacity to monitor resource use.

Institutional sustainability on the government's side refers to the ability of Uganda Wildlife Authority and its support agencies to maintain the activity. Institutional sustainability is crucial but vulnerable. In the face of lack of manpower and finances, protected areas have been overexploited and damaged. In times of national insecurity, government organisations are often more vulnerable than local communities to disruption. By broadening the responsibility for conservation to local communities conservation is almost certainly better safeguarded during these crisis points, than if the communities are hostile. A major effort of integrated conservation and development projects must be the institutional capacity building of both community organisations and protected area management authorities. The need for the management authority to retain its capacity to enforce the law, albeit in a subtle, judicious and preferably participatory manner has been discussed. Likewise the community needs a mechanism to seek redress against slow or unfulfilled agreements on the part of the government agencies. The lack of implementation by government can be a serious discouragement to collaborating villages. It may be necessary to establish a "collaborative management ombudsman" if normal channels are ineffective. Despite the strides made by Uganda Wildlife Authority to develop community conservation programmes these are fragile and in times of financial constraints have been reduced and park managers may return to more coercive methods (Infield and Adams, 1999). In a recent evaluation of the community conservation programme at Mgahinga it

was recognised that the programme had some successes and that the community seemed to have accepted the restrictions imposed by the park on access to land and resources, and partially defused the tensions that were reported in section 3.1.1. Despite this initial success both the institutional and financial sustainability of community conservation and even the park itself remains in question (Infield and Adams, 1999). Bwindi on the other hand currently provides up to 80% of the total revenue of Uganda Wildlife Authority and significantly supports other parks (R. Robinson pers.com.).

4.5.1.2 Distinction between animals and plants

In the discussions on resource use there is confusion regarding the responses of animals and plants to utilisation.

- When harvesting animals the whole animal is killed and removed. When harvesting plants, removing the whole plant is less common, at least under the arrangements made here.
- Many plants reproduce vegetatively and they have a varying but often good potential to regrow after a part has been removed, which animals cannot do.
- The life span of most animals is short in relation to many perennial plants. Some clonal plants are virtually immortal.

Removal of parts of some species has the effect of increasing not decreasing their life span. For example cutting (coppicing) individual trees on rotations of 7-20 years is a type of use that has been practised in the temperate forests of Britain for over a millennia. Trees with a normally short life span of 100-200 years without cutting can have their life span considerably extended by coppicing.

> "Longer lived still are the coppice stools. These are completely self-renewing and capable of living indefinitely as long as they are not overshadowed...Stools in the Bradfield Woods, Suffolk, are up to 18.5 feet (5.6m) across, may be the oldest living things in Britain (at least a thousand years); they still yield good crops of poles." (Rackham, 1990).

Not distinguishing between animal and plant communities may cause confusion in the discussions over utilisation. For example Robinson (1993) states:

> "**Any** exploitation of a species will remove part of a biological community with concomitant effects on community dynamics and ecosystem functioning." (Robinson, 1993) (my emphasis).

While this may be true of animal populations, this is clearly not true of the removal of a few handfuls of leaves of a widespread tree, as is the case with some of the medicinal herbs at Bwindi. Robinson also says ;

> "the more species-diverse habitats, such as tropical forests, do not appear to contain single species with high enough densities and rates of population increase to be commercially exploited. The potential harvest of many species is therefore minimal, and the possibility of human use is limited. For these species, **any** significant harvest will drive populations to local extinction." (Robinson, 1993) (my emphasis).

I agree that tropical forests have a lower potential for utilisation than other vegetation types that their plant species are vulnerable to commercial exploitation, and that potential harvests of many species may be minimal. The minimal use of the least vulnerable species may, however, be significant to local communities such that they are prepared to play their role in forest protection if use is legitimised. Significant overexploitation of the timber trees *Podocarpus milanjianus* and *Entandrophragma sp.* in Bwindi during the period of uncontrolled use did not, however, lead to their local extinction and they are strongly regenerating in the forest.

4.5.1.3 When is no use unsustainable?

I cannot agree with Robinson when he says:

> "One must recognise, however, that **any** use of a biological community will ultimately involve a loss of biological diversity." (Robinson, 1993) (my emphasis).

In the area of protected area management there are a number of situations where no use may entail more risks than use.

- The ecosystem may have evolved with human use and be dependent on use for the maintenance of key species.
- Recent impact use or land-use change may have altered ecosystems so that there is no return to no/low impact.

- Conservation occurs in a social and political context where no use may be incompatible with the maintenance of the long-term viability of the ecosystem.

With the recognition that humans have long been part of the world's ecosystems, the rigid concept of pristine ecosystems is weakening (McNeely, 1994). The evidence for extensive past use of seemingly virgin forests mounts (Pimbert and Pretty, 1997). Woodlands and grasslands in Britain have been managed for centuries under particular coppicing and grazing regimes. Ironically when many of these ancient sites first became nature reserves, traditional uses stopped and species extinctions ensued (Rackham, 1990). Conservation management in Britain often attempts to recreate traditional exploitation patterns.

Recent impacts often increase a dependency on human intervention. At Bwindi buffalo (now extinct) and elephant (now very low populations), caused disturbed secondary habitats that the mountain gorillas prefer. Secondary vegetation is now common in the forest due to timber harvesting. With better protection the forest is regenerating, and gorilla habitat is likely to decline. The level of plant use established at Bwindi is far below the impact necessary to maintain secondary habitats and causes less vegetation destruction than tourist trails cut daily for gorilla viewing. Robinson (1993) recognises that intermediate levels of disturbance often lead to higher levels of biodiversity, but I disagree with him that human activities are always at a level that go beyond this disturbance regime. Viewed on a global scale the natural world is under severe pressure, but to argue for no use is unrealistic.

Returning to the Bafumbira saying quoted at the beginning of chapter three "Iyo utarikumvikana numuturani, ntaho umutabara - When your neighbour is your enemy you let his house burn." We have seen that community indifference to controlling fires or worse burning the forest deliberately, as well as making threats against the gorillas was the result of conservation policies that did not take into account community needs. In Sri Lanka resentment caused by closing forests to all kinds of extractive use following the declaration of some forests as National Wilderness Heritage areas has also led to the burning of forests. In this case the targets for fires were plantations of *Pinus caribaea.* The fires causing damage, which in 1986, cost an estimated US$ 1 million per year (Gunatilleke *et al.*, 1993). When the target of the fires is the natural forest for which the no extraction policy is aiming

to protect the net value of the policy is doubtful. A policy of no use can, therefore, actually bring greater risks to an ecosystem where communities depended heavily on the resources. The hostility caused by cutting off these resources can be an extremely risky strategy as has been proven time and again in recent conservation history. Aggressive protection is vulnerable to "crisis points" when law enforcement fails. Crisis points are very significant long-term factors to be taken into account when determining conservation policies. In other words a protected area which has no local support, which provides no local benefit and which is maintained only by force, will be at greater risk from occupation or destruction in times of insecurity and the breakdown of law and order than a protected area in which local communities play a role in management, are benefiting from the park and have developed a good relationship with the park management.

4.5.2 Equity

Throughout this study equity has been seen as an ethic to be aspired to. Much of conservation action over the last one hundred years has been an ethical contest between a poverty and human rights agenda and promoting the rights of existence of other species. This has come into sharp focus in the debate over the lack of equity of communities that live adjacent or in protected areas especially, national parks, in Africa and elsewhere under conservation policies that are variously called "fines and fences" or "fortress conservation" (Grove, 1987; Western and Wright, 1994; Stevens, 1997; Ghimire and Pimbert, 1997; Hulme and Murphree, 2001). There has been a heightened sensibility about the environment and the interests of local people (Western and Wright, 1994). Achieving an equitable balance between the needs of people and the survival of other species underlies the dialogue on sustainable development and equity evident in the world conservation strategy and its derivates (IUCN/UNEP/WWF. 1980; Jacobs and Munro, 1987; IUCN/UNEP/WWF, 1991). This has attempted to bring biodiversity conservation and economic development together, such that conservation uses the marketplace to bring economic benefits to local communities while promoting parks as a productive sector of the economy. The narrative described in section 4.4.3.1 on 'fortress' conservation versus the 'new' conservation, is also based in large part on the equity issue and attempt to improve African livelihoods as well as achieve conservation. Much of the debate has

hinged around the notion of utilisation of biodiversity versus that of existence rights, with the many proponents supporting the use it or lose it view, but others arguing that any use of wildlife will result in loses in biodiversity (Robinson, 1993). With the ongoing losses of both habitats and species there are calls for a more protectionist mode of conservation (Oates, 1999; Terborgh, 1999).

In a practical case of attempting to implement the new conservation, this study, through participation of the communities living adjacent to Bwindi and Mgahinga Forests has documented the costs that local people pay and through a programme of resource use attempted to improve equity in the context of unpopular establishment of forest national parks. Resource use has just been one among a number of interventions aimed at achieving greater local equity. It is argued here that a neighbouring population that is supportive of conservation will collaborate more effectively with managing agencies and may be more protective of the park should civil unrest undermine the effectiveness of the agencies of law and order. Ethical considerations have underpinned much of the preceding discussion especially in the sections on resource use, and collaborative management. It can be seen that the outputs of this work have enhanced equity towards the local community in four main areas.

- **Including communities in decisions making over conservation.** Including community representatives in the process of management planning and the establishing resource use, through the development of participatory methods, has helped achieved some level of equity in terms of decision making.

- **Returning some tenurial (harvest) rights.** The programme has advocated the low impact utilisation of some resources from within the national parks over which the neighbouring communities have gained use privileges/rights and contributed to changes in national parks legislation to allow this.

- **Promote limited socio-economic benefits through resource use.** While the economic values of the harvested resources are not high, they are nonetheless real. It may be, however, the social element, of access to traditional resources and the

maintenance of specialist livelihood occupations in support of the community as a whole that may actually be more important than direct economic values.

Resource use along with park revenue sharing, trust funding, agricultural support and institutional development has provided relatively high levels of benefits compared with other protected areas, even though these undoubtedly fall short of those needed to alleviate poverty.

> "Overall, when community-conservation activities of the different organisations are taken into consideration, there is no doubt that there are significant social and economic benefits accruing to communities and generated because of the parks. While this may still not be adequate in terms of who benefits and what the benefits are, it is far more that the local communities around most other PA's in the developing world can hope for! In this sense what DTC and partners have achieved is, in many ways, commendable and a model for other protected areas." (Worah *et al.*, 2000).

At the same time an attempt has been made to ensure that there is equity towards the species that are being harvested considered in the terms of sustainable use. A rapid technique has been used to assess vulnerable species and promote further research into these in an attempt to mitigate problems. At the same time resource use has aimed to enhance the security of the forest as a whole by promoting user responsibilities. The forest is undoubtedly both better protected and better supported by local communities that was the case a decade ago. The Bwindi National park is an currently an important contributor to the economy, locally and national and financially supports much of the national park system in Uganda.

Is resource use, however, really a policy of divide and rule? Previously the community was united in its common hostility of the park, does giving "favours" to some individuals divide the community? Certainly there are winners and losers. Those engaged in certain activities, particularly gold mining, pitsawing and hunting have had their livelihoods curtailed, although these activities, with the exception for some of the pitsawing, were illegal.

Under the arrangements established at Bwindi individuals are nominated by the community as a whole and have clear responsibilities to serve the community. Many of the activities sanctioned have long been practised by specialists rather than by the community as a

whole, and in those parishes and for those resources that use has proceeded, few specialists have been prevented in carrying on their speciality. Apprentices have been allowed to accompany the resource users so that skills and livelihoods can be passed to future generations.

In the process of establishing resources use community opinion was definitely divided. Many of the resources users themselves, with very little trust in government felt that the programme was another government trick. However, with (more or less) consistent practice of the programme, trust has gradually developed. By and large the communities are supportive of the national park now (pers. obs. 2000).

The situation of the Batwa has proven to be less tractable. Very limited progress was made in improving the situation of the Batwa. Their lives are more intimately tied up with the forest and they use forest products that the other communities do not. A recognised weakness of the participatory techniques used, was their limited ability to effectively deal with issues of the social exclusion of minorities. Never the less the Batwa were included in the resources use agreements. The continued illegal honey hunting of the Batwa, which is the likely caused over half of the fires started within the forest and 24% of all the fires in 1999, will continue to bring them into conflict with the park authorities. A specific review of the resource use practices of the Batwa and re-evaluation of other activities that they can carry out should be included in future reviews of the multiple-use programme.

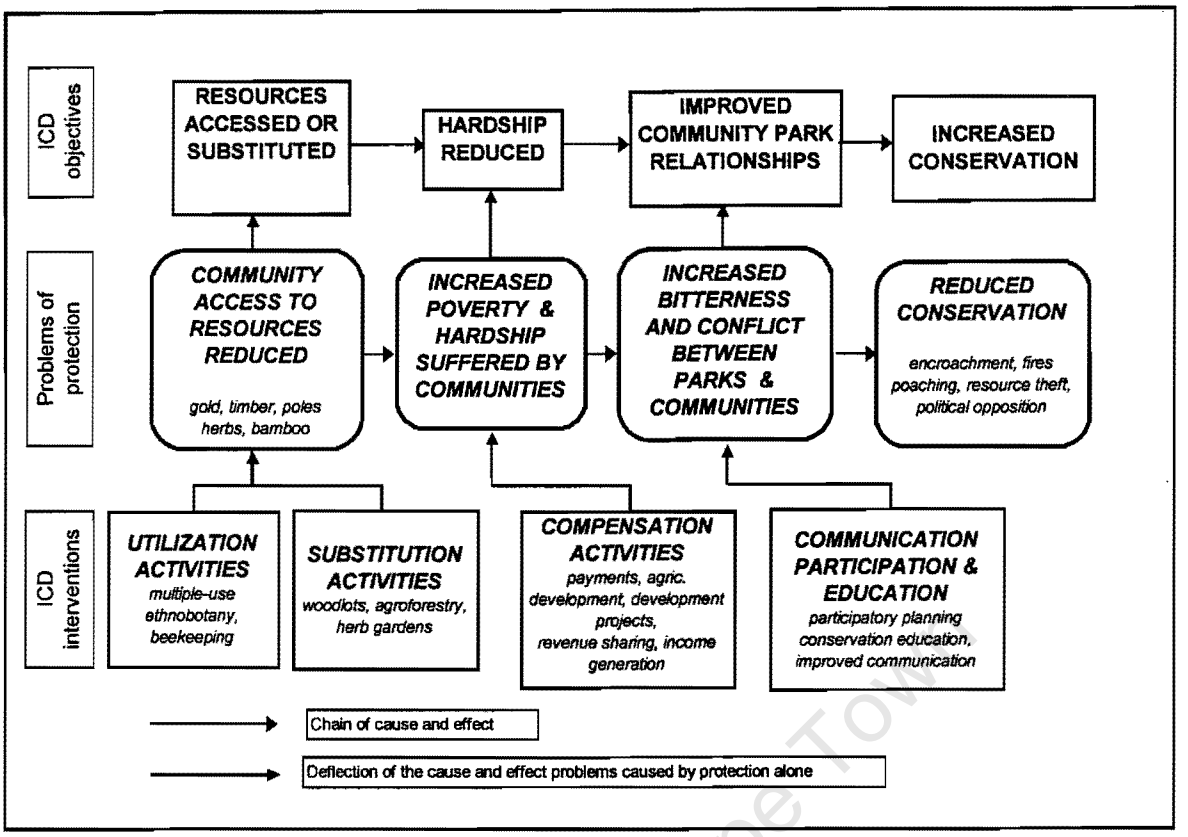

Figure 27 Linking conservation and development - deflect the problems of protection alone.

An outstanding question is whether the very low amount of resource use established at Bwindi will be sufficient to ensure stable long-term relationships between park and community. As one community member put it "while we are pleased to be allowed to continue our beekeeping it represents only a quarter of our former benefits from the forest".

4.6 Conclusions

The independent evaluation of the multiple-use programme in 1995 made the following comments regarding the establishment of plant use.

> "The Multiple-use personnel have made remarkable progress in implementing the pilot programme. Rapid resource assessments have been done, potential multiple-use zones mapped, and local institutions established with a solid foundation in indigenous social structures. Three memoranda of understanding have been negotiated and are being implemented, with some monitoring of the off take and effects on utilised species.....The DTC/UNP multiple use personnel can be commended for having done a thorough and thoughtful job in initiating multiple-use at Bwindi." (Bensted-Smith *et al.*, 1995).

The report went on to recommend 1) the extension of the programme beyond the pilot phase and 2) that the experience gained at Bwindi should contribute to formulating a national policy for resource use. Policy and then legislation was developed which then allowed resource use from within Uganda's national parks. After a long delay, due to institutional upheavals in Uganda Wildlife Authority expansion of the programme beyond the pilot stage in Bwindi was approved in the year 2000.

The use of pant resources from within national parks in Uganda is a radical departure from traditional protected area management practice. The low impact use of plant resources from within Bwindi has shown good promise to contribute to the reducing of conflict between park authorities and local communities and to engender support and a sense of ownership towards the national park from its neighbours.

> "Communities in multiple-use parishes made strong statements indicating an increased sense of ownership of the forest as a result of the programme, frequently referring to "our forest" and stating that it had been given back to them." (Bensted-Smith *et al.*, 1995).

It is my contention that this sense of ownership is crucial to local community support to conservation. Even in situations where there are no substantive needs for access, some kind of involvement and relationship with the protected area, I feel, should be the presumed position. Denying access and therefore stifling that relationship should be considered only under very exceptional circumstances. As community development occurs the nature of the relationship is likely to change but it should not be curtailed

It is important to continue to evaluate the effect of the resource use programme on gorilla conservation as conflicting assertions were made, by the communities, regarding their ability to prevent gorilla poaching from strong outside sources. Bensted-Smith *et al.* (1995) add a cautionary note:

> "It is too early to say whether this (improved relations and sense of ownership) will result in more effective protection of the forest and the gorillas, or how significant the benefits of multiple-use are compared the other **potential** elements of a community programme." (Bensted- Smith *et al.*, 1995) (my emphasis).

In the long term benefits of this low level of resource use may be low, but one of the main points of plant use is that it is immediately implementable, while one of the greatest problems with integrated conservation and development is the gap between the intention to

enhance the flows of the benefits to communities through a community programme, and those benefits arriving. Thus at Bwindi resource use provided a useful interim trust and relationship building measure while the other integrated conservation and development programme initiatives were being developed. The Development Through Conservation project is now being recognised a model for a project type, which has seen a high number of failures.

> "Overall, the review team felt that the Development Through Conservation Project (DTC) was well on its way to achieving its main objectives. Some very innovative and far-sighted actions have been incorporated into the project (such as the multiple use programme, the farmer experimentation approach and the institutional framework), which provide lessons for other projects and will contribute to the long-term sustainability of DTC. The long tenure of DTC in the area, unlike other ICDP's with much shorter timeframes has allowed room for "real" participation, experimentation, joint learning, partnerships and institution building. In many aspects, DTC is a "model" ICDP for others to learn from." (Worah *et al.*, 2000).

The development of the Mgahinga and Bwindi Trust fund as a locally based long term institution, provides long term and sustained financial support to conservation and development activities in immensely important for the long term continuation of the 'of these two important national is a greatly import ant development to enable the conservation , resources use plays its part as one of the community conservation initiatives which supports conservation.

With the approval to expand the programme beyond the pilot phase the programme is now operating in 19.8% of the park and with 14 multiple-use areas mapped and operational. The forest is undoubtedly better protected than at the height of the uncontrolled exploitation in the mid 1980s's. At the height of the hostilities resulting from efforts to control this exploitation, the communities would have no thought of protecting the gorillas. Now there seems more willingness to take part in gorilla protection, but uncertainty about capacity to do that. Certainly the damage of forest fires appears to have been reduced there were reports of the beekeeping areas being those with fewest snares (Watts *et al.*, 1996) and incidences of illegal activities reduced over all (McNeilage *et al.*, 2001).

In the 1970's and 80's the forests were severely under threat from over utilisation now, however, they are not threatened and in the case of Bwindi at least are supported by the

majority of local people, and are well integrated into the institutional framework of the districts in which the lie. Unlike parks elsewhere they are neither just on paper nor in peril.

Kremen *et al.*, (1994) have stated that the new paradigm of integrated conservation and development is perhaps one of our last and most promising hopes for protecting beleaguered natural areas. They go on to note that these programmes are complex and difficult to implement due to the inherent problem of reconciling the fundamentally different goals of conservation and development. However, as Pimbert and Pretty (1995) point out:

> "Conservation efforts may need to identify and promote those **social processes** that enable local communities to conserve and enhance biodiversity as part of their livelihood systems (Pimbert and Pretty, 1995)." (their emphasis).

The model of plant use established at Bwindi is just one of the range of initiatives aimed at promoting such social processes that are going on in Uganda and elsewhere (Carter, 1996; Hobley, 1996). These are part of a wide range of initiatives that have become known a collaborative management. Much of the debate now hinges on two closely related themes that of the type and manner of participation used in establishing joint management arrangements and the degree of devolving responsibility and ownership of the forested areas to communities. The approach taken at Bwindi has been radical on the one hand, allocating one fifth of a high profile, sensitive national park for community use, and conservative on the other hand with limited resources allowed and careful selection and negotiation of plant use. The reactions to this approach have ranged from deep concern by some conservationists over the possible impact on the mountain gorilla, to criticisms regarding the limited handing of management authority to local communities from advocates of greater community control.

It is hoped that, in whichever direction the plant use programme at Bwindi develops, it continues to build on its strengths, and both brings benefits to neighbouring communities and contributes to the conservation of this special forest and its valuable wildlife.

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6 PERSONAL COMMUNICATIONS

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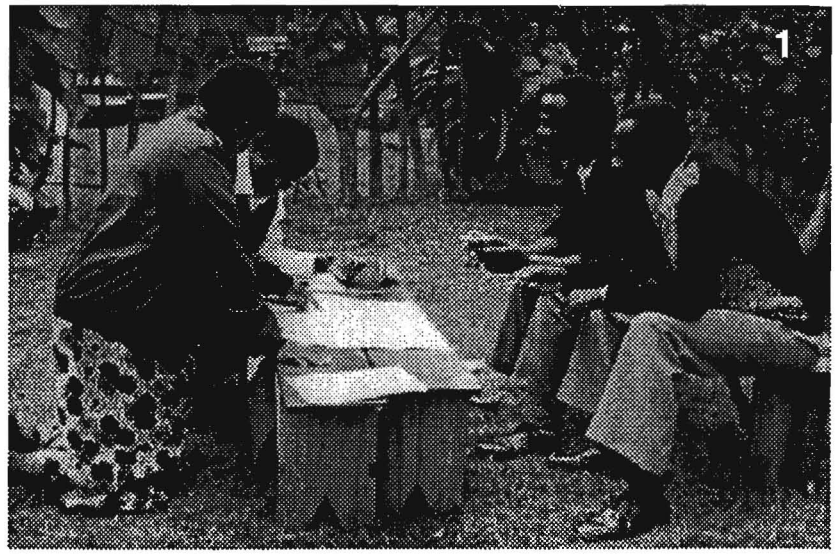
J. Tindiwegi, CARE Uganda, PO Box. 7280, Kampala, Uganda.

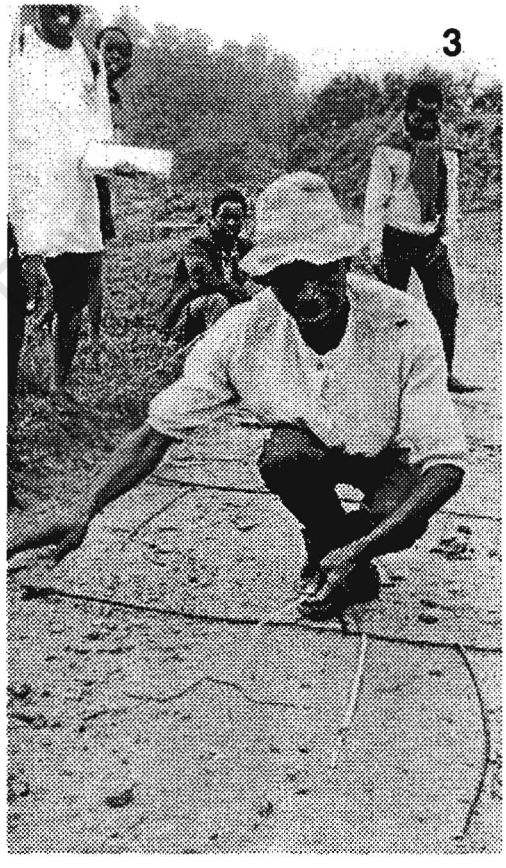
C. Tumwesiimire, Park Ranger, BINP, UWA, PO Box 3530, Kampala, Uganda.

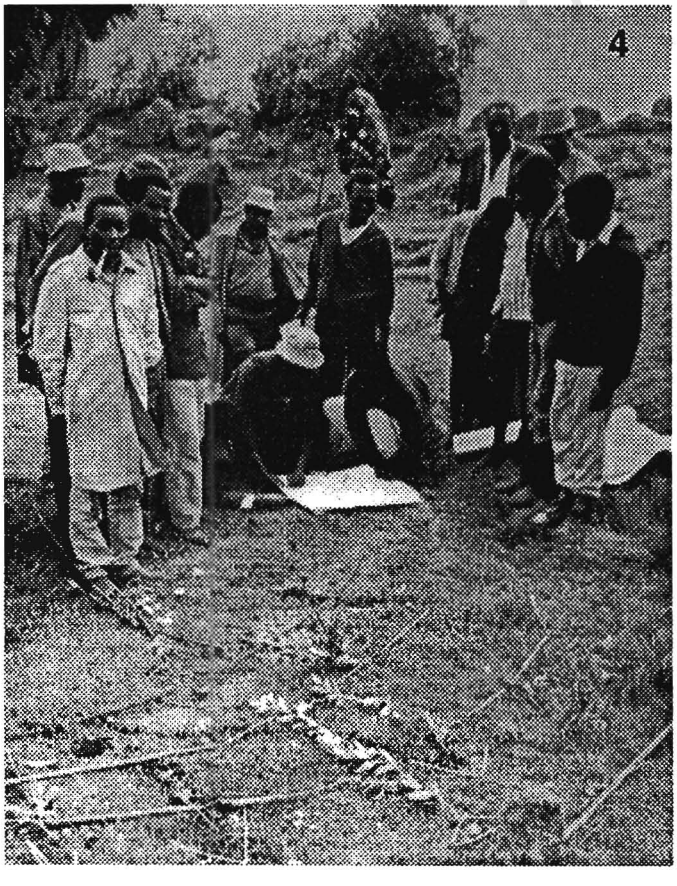
1. Community representatives and Park-Warden at BINP Management Plan Workshop



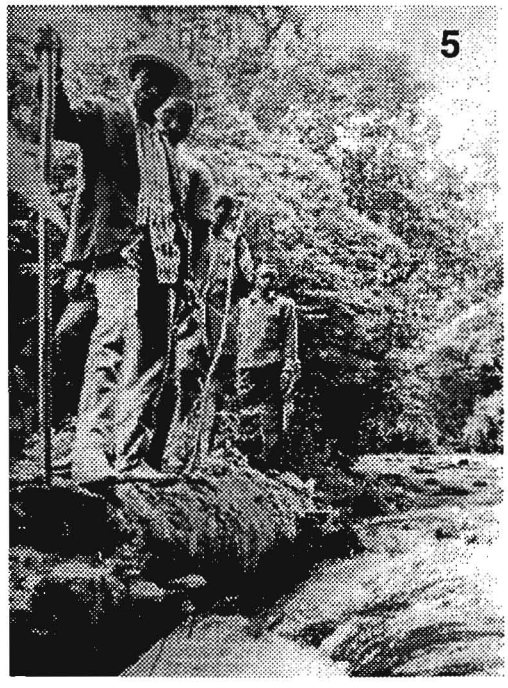
2. Herbalist Teresa Kagwimukama (left) and DTC facilitator Virginia Nyamaguru using the towel board

3. Elder Muhairwe Francis constructing stick graphs, Nteko Parish

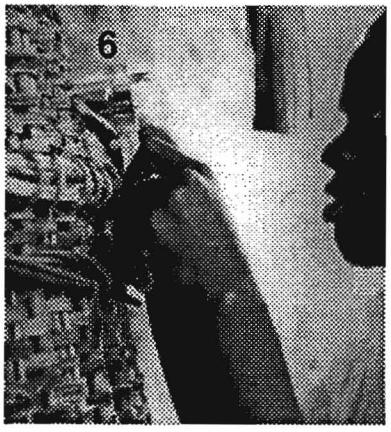




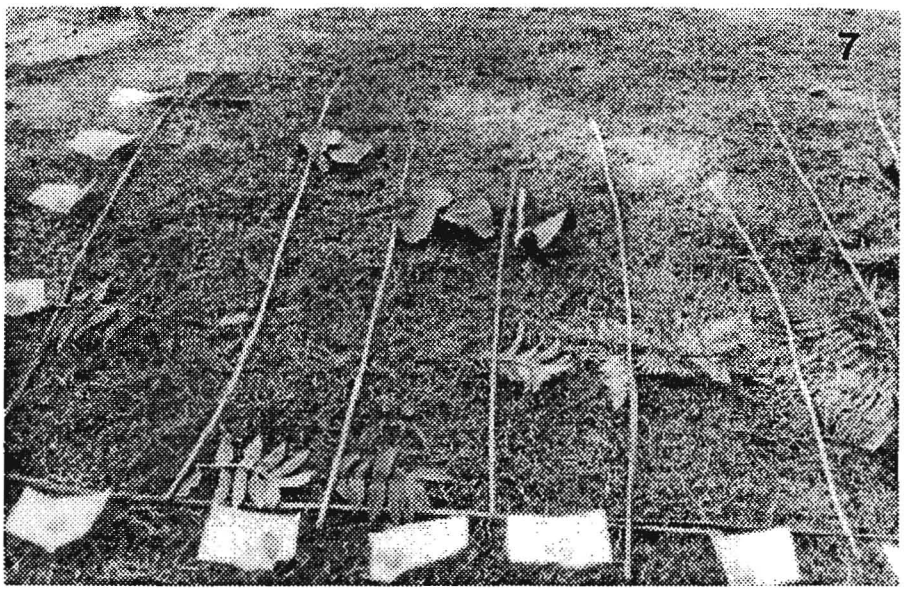
4. Group constructing a ground map of beekeeping areas at MGNP



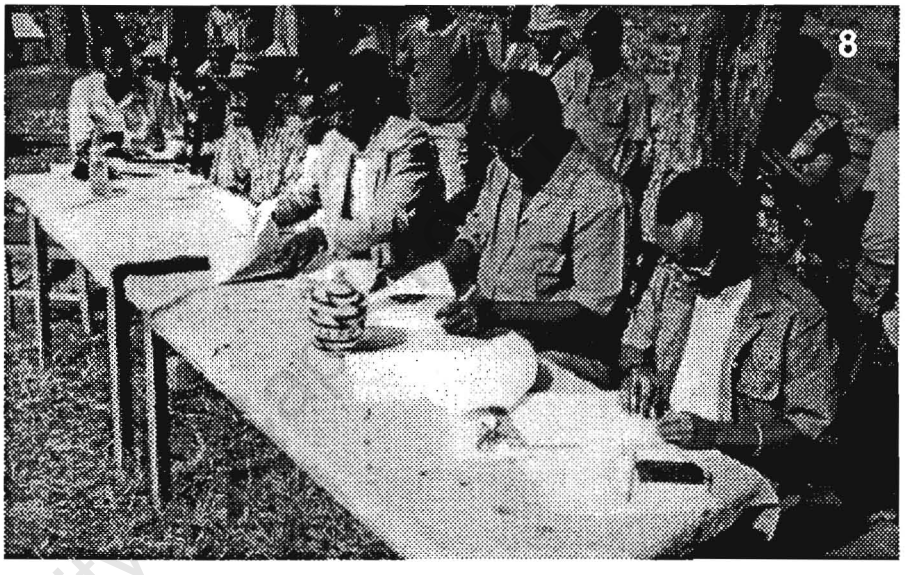
5. Nominated Boundary Survey team at R.Ihihizo crossing



6. ITFC Research Student, Sam Magume, quantfies use of *Loesneriella apocynoides* in a granary

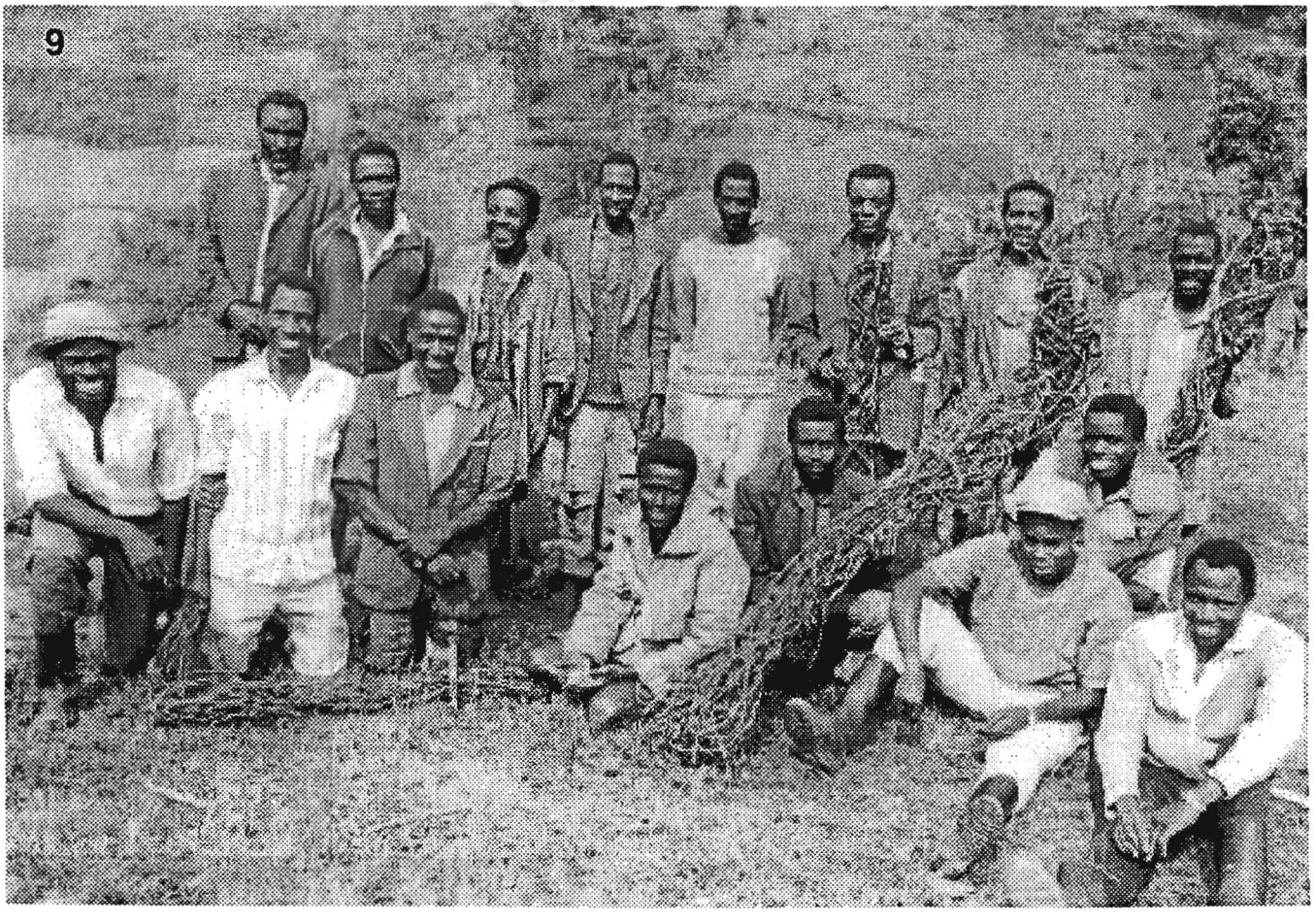


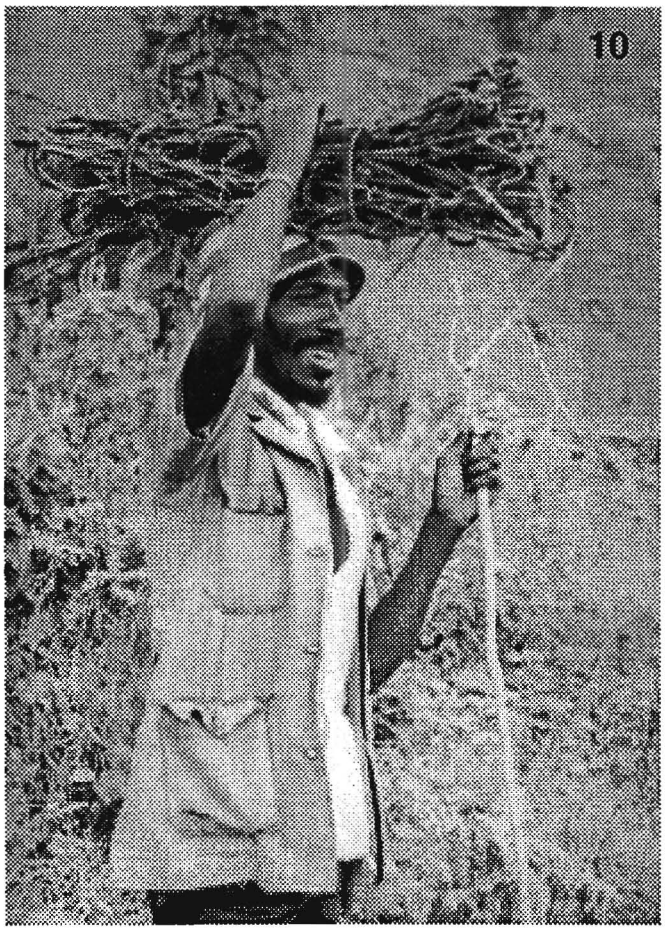
7. Ground relationship graph by Park rangers of BINP(Figure 15)

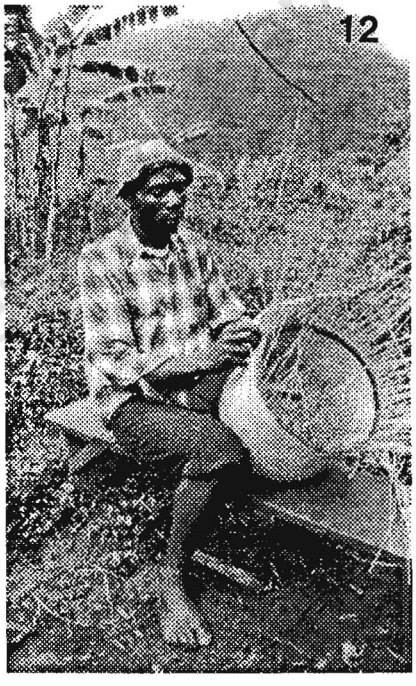


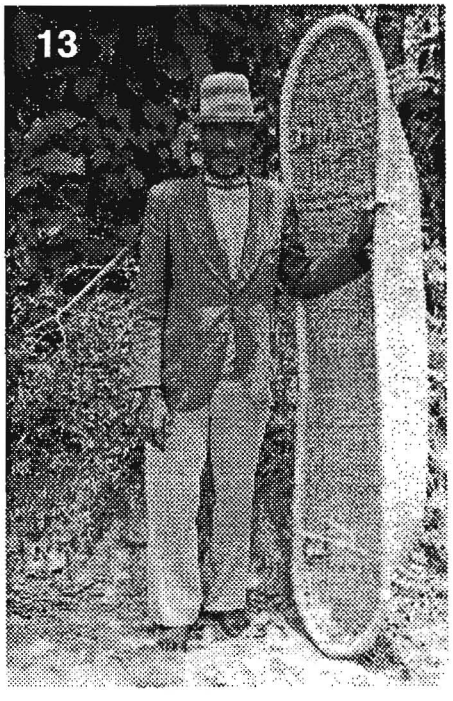
8. Signing ceremony of the memorandum of understanding, Mpungu Parish. Dr. Edroma, Director UNP second right

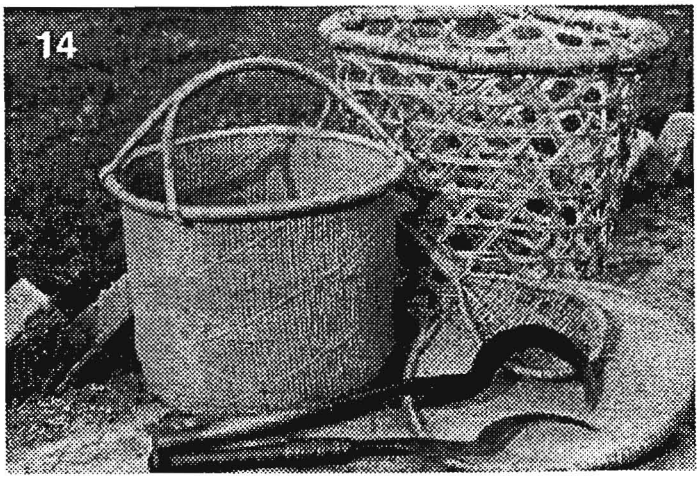
9. Resource users and park staff after the first collection of enshuri from Ntendure multiple-use area, Mpungu Parish











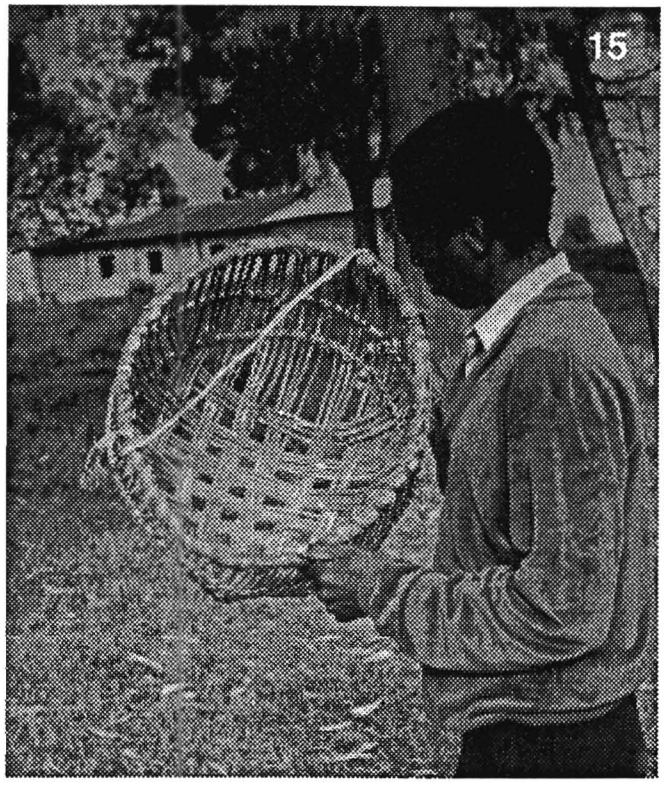
10. Resource user Katanguka with Enshuri -*Smilax anceps*

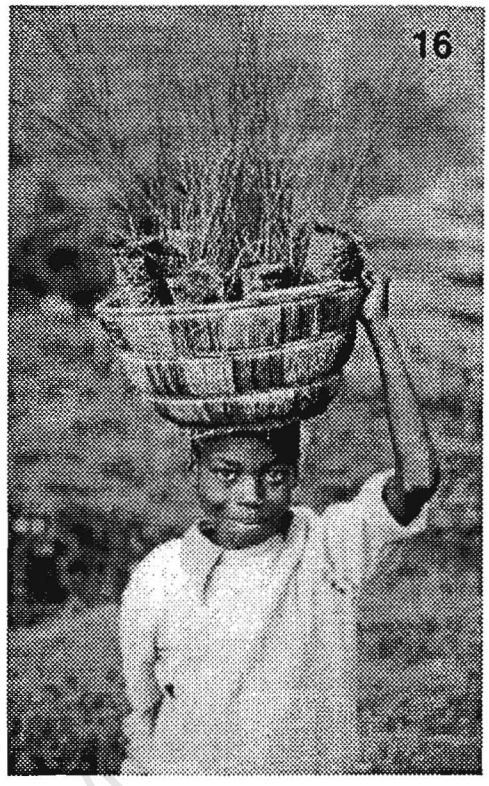
11. Elected Chairman & Vice Chairman of the mineral springs, Rubungira Didasi and Rwabinyasi Paurino, standing in the spring itself

12. Basket maker Barugahare Tomasi makes Ebitukuru, agricultural basket from *Smilax anceps*

13. Stretcher maker with stretcher - engozi of omujega - *Loesneriella apocynoides* (Photo J. Mutebi)

14. Various products made with or using *Smilax anceps* - Enshuri

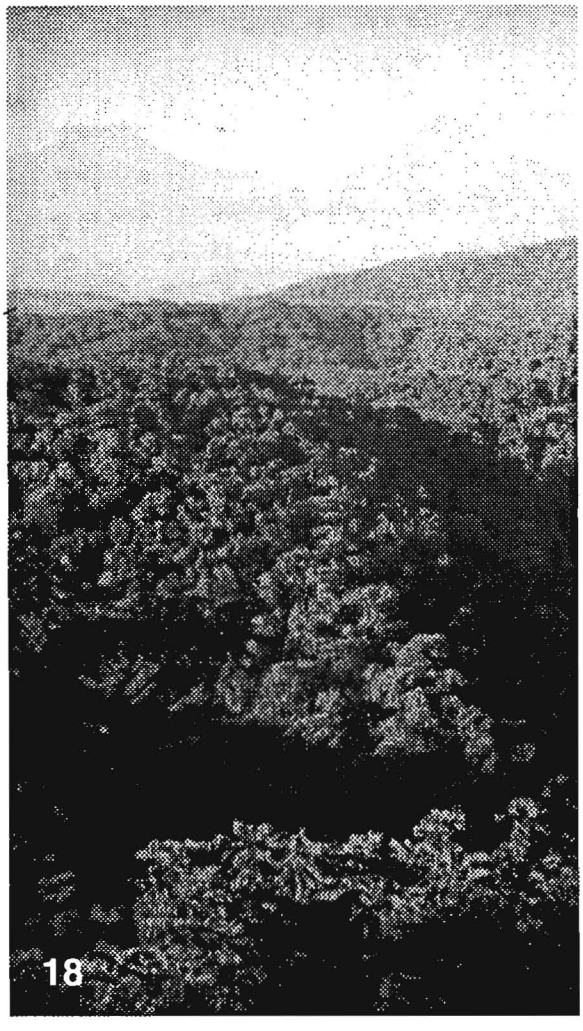




15. Community Conservation Ranger Caleb Tumwesiimire, inspecting an Omushambya - *Dodonaea viscosa* plucking basket

16. On farm tree planting of *Casurina cunninghamiana*

17. *Loesneriella apocynoides* - Omujega sprouting from a cut stem

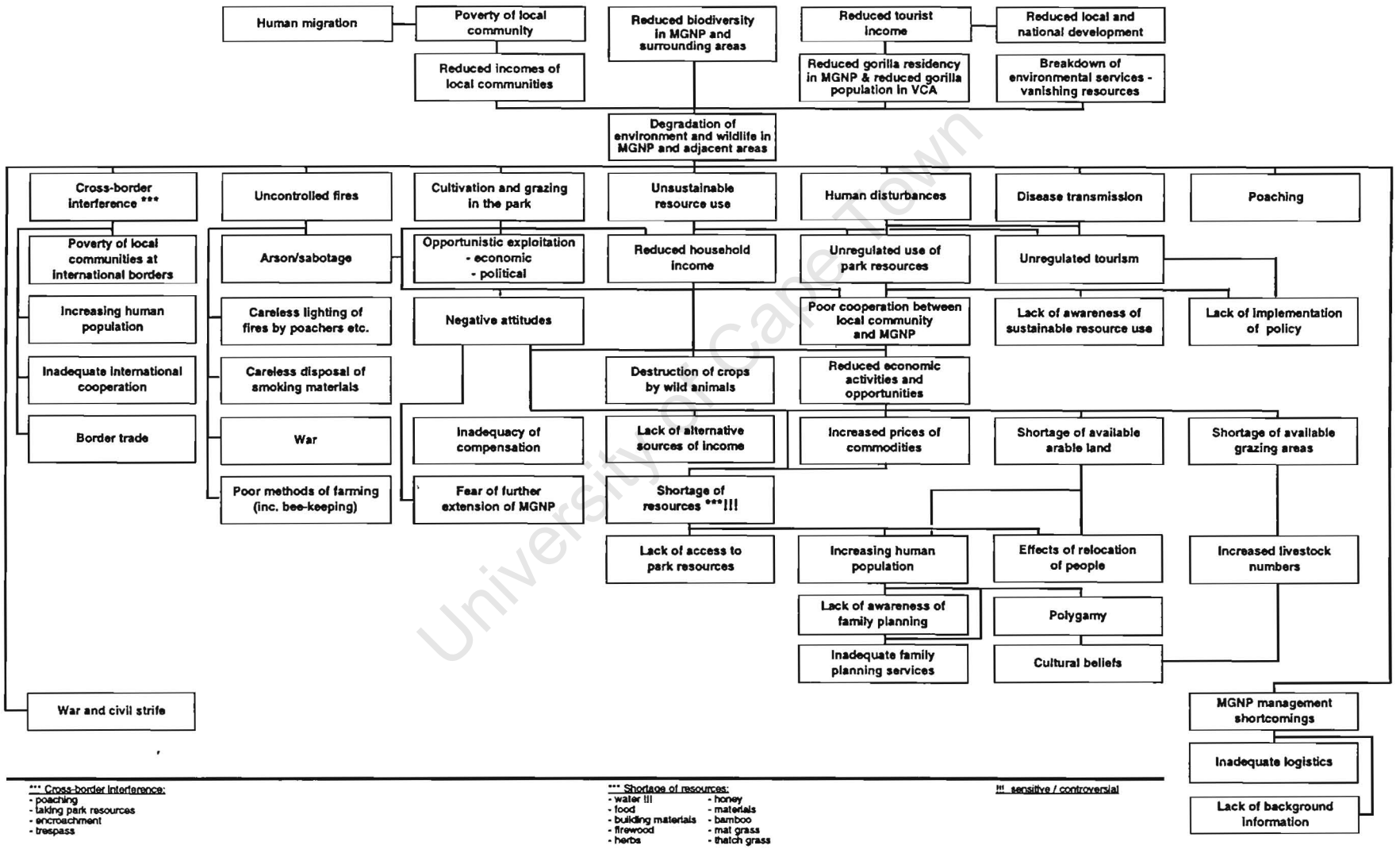


18. Bwindi forest in foreground and Mgahinga forest and Virunga Volcanoes in background

APPENDIX A1.

PROBLEM TREE ANALYSIS

Mgahinga Gorilla National Park - Planning Workshop 14-18/2/94
PROBLEM ANALYSIS



*** Cross-border interference:
- poaching
- taking park resources
- encroachment
- trespass

*** Shortage of resources:
- water !!!
- food
- building materials
- firewood
- herbs
- honey
- materials
- bamboo
- mat grass
- thatch grass

!!! sensitive / controversial

APPENDIX 2 SUMMARY TABLE OF MANAGEMENT PLAN DECISIONS

Summary of objectives and management actions	Objectively Verifiable Indicators	Means of Verification	Important Assumption - External Factors
Overall Park Goal Biodiversity in MGNP maintained or enhanced	.....that measure achievement of Overall Goal G(a) 5% population increase of fauna and flora e.g. golden monkeys gorillas over 1992 levels by 1998 (b) 5% increase of animal sighting during patrols over 1993 levels by end of 1998	 Patrol report Census reports	
Plan purpose Conservation and sustainable management of natural MGNP and adjacent area improved	.....that measure achievement of Plan Purpose P(a) Area of bamboo zone 2 of the Park Increased by 30 over 1995 levels by 1988 using only indigenous species of the same genetic stock (b) Increase gorilla population and the duration stay of habituated groups as compared to early 1991 level enhanced by 15% (c)Number of farmers woodlots of more than 0.25 acre increase by 20% over 1994 level by 1998	 aerial and photographs Park records Physical inspection	to achieve Overall Goal Assuming no outbreak of major diseases Co-operation in the Virunga region continues Conservation in other Virunga parks is maintained
Results or Outputs 1 Ecological and farming systems of MGNP and adjacent areas understood by park staff and local communities	.....that measure achievement of Results 1 (a) Research Plan produced by and 1995 (b)Biological and social data bank and information centre established and accessible at Park HQ by 1998 (c) 40% of Park staff adequately trained in ecological and farming systems by 1996. 20 workshops held for local community members by 1998	 Approved document in place MGNP reports Site inspection, data bank outputs	to achieve Plan Purpose Productivity of available of available land in areas adjacent to MGNP is improved Co-operation on tourism management in the Virunga region continues General security ensured Adequate funding available from UNP plus donors
2 Mutual understanding and co-operation between MGNP and local community improved	2 (a) Conservation Education Plan developed and implemented with adjacent local community by end 1995 (b) Crop raiding issue addressed, discussed by end 1994 and practical solution implemented by 1995 (c) Productive PMAC meetings held each year (d) During the six monthly community/park liaison meetings, the number of complaints reported by either side decreased by 20% over 'successive meetings during the period 1994 to 1998 (e) 80% reduction in fire incidence by 1996 from 1991/92 level	6 drama/side shows held by 1996 MGNP /DTC reports Action plan Workshop report Meetings held twice a year with local communities Minutes MGNP monthly reports MGNP monthly reports	
3 Appropriate multiple-use systems and procedures established	3(a) Agreed park resources being collected in agreed quantities according to agreed procedures ensuring sustainable use by the people of the tree parished adjacent to the park by 1995 (b) Agreements between MGNP and local communities on access to park resources acceptable both parties and signed by June 1995	MGNP records Community records Signed agreements	

4 Systems procedure for sustainable tourism established	4 (a) Average occupancy from tourist activities than 75% 1994 by end of 1996	MGNP statistics Records on control sheets MGNP monthly reports	
	(b) Number of tourists visiting MGNP does not exceed set limits offers during planning period 1994 - 98	per day Records on control sheets MGNP monthly reports	
	(c) 12 ranger guides trained in appropriate interpretation , visitor handling and provided with field equipment by end of 1995	MGNP reports Equipment inventory Visitor questionnaires	
	(d) Park guide booklet produce by end 1996	Park guide booklet	
	(e) Annual review meetings to discuss tourism management systems held	Meeting minutes	
5 Economic and social activities of local communities supported	5 (a) At least 3 viable community projects completed by 1996 from MBIFCT sharing programmme resource	MGNP reports Community reports Administration report Site visits	
	(b) Two major reliable water schemes (Nyakagezi and Kabiranyuma) completed and adequately maintained by 1998	MGNP reports WDD reports	
	(c) Number of park related jobs increases by 10% from	Water committee reports Site visits	
6 MGNP Management Systems improved	6 (a) The MGNP HQs buildings dings constructed by end 1998	Site visits MGNP report	
	(b) Levels of illegal activity in the park do not increase over levels established early 1994 over the period 1994 - 98	Monthly summaries Patrol reports Monthly summaries	
	(c) Road to MGNP HQ/rehabilitated by mid 1995	MGNP reports Site visits	
	(d) Airstrip rehabilitated by 1998	Annual work plane Workshop reports	
	(e) Monthly park management liaison meetings and quarterly park and project management liaison meetings held	Minutes	
	(f) Annual Management Plant review works shops held	Annual work plans Work shop reports	
	(g) A financial accounting system has been put in place by 1994 end actual expenditure varying from budgeted expenditure by no more than 20% in any major expenditure category	MGNP financial reports	
	(h) Administrative system for procurement of vehicle has been put in place, vehicles and equipment procured end well maintained to such an extent that they are out of order by less than 10% on average	Log books	
	(I) 18 km of park boundary clearly maintained during the plan period 1994 - 98	site visits Monthly reports	
	(j) 50% of park staff have been trained in various fields by 1998	Training programme Monthly reports	

7 MGNP income increased	7 (a) MGNP grass income increased by 15% annually until 1996 based on the 1994 levels	MGNP financial reports	
8 International co-operation in support of MGNP improved	8 (a) 10 joint patrols with neighbouring parks	Joint patrol trip reports MGNP monthly reports	
	(b) At least one (1) producture meeting the region the once a year	Minute reports MGNP monthly reports Number of reports exchanged	
9 Formerly cultivated area revegetated	9 (a) 15% of natural succession by indigenous trees in zone will have occuured by 1998 from 1990	Physical inspection fixed point photography Quantity of biodiversity in specific similar areas	

Management Actions	Assumptions to achieve the Results/Outputs
Ecological and Farming systems and adjacent areas better understood 1.1 Identify research priorities 1.2 Determine appropriate research methods 1.3 Train staff of both MGNP and local communities 1.4 Carry out research programs in both MGNP and local communities 1.5 Determine mechanisms for dissemination of research results 1.6 Disseminate research results using appropriate methods 1.7 Review progress and result of research and their dissemination Mutual understanding and co-operation between local communities and MGNP 2.1 Develop and carry out conservation education programmes 2.2 Examine problem of crop raiding by wild animals, and find solutions 2.3 Implement workable solutions problem of crop raiding by wild animals 2.4 Hold PMAC and LCSC meetings Appropriate Multiple - use systems and procedures established 3.1 Identify species and/or resources needed by local communities from the park 3.2 Evaluate impact of utilisation on requested species and/or resource, and on ecosystem 3.3 Identify alternative to and/or substitutes for park resources suitable for on - farm production 3.4 Agree on species and resources for utilisation (including quantities and parts to be collected) 3.Establish procedures, mechanisms and rules for collection of park resources 3.6 Establish monitoring and control systems Systems and procedures for sustainable tourism established 4.1 Continue development and enforcement of appropriate regulations and guidelines concerning eco-tourism in MGNP 4.2 Construct and appropriately equip visitor information centre 4.3 Maintain an information and booking office 4.4 further develop systems to handle and guide visitors, and ensure their safety 4.5 Maintain trails for nature walks cave exploration, mountain climbing, bird watching, etc. 4.6 Provide and maintain appropriate sanitation facilities 4.7 Develop appropriate accommodation for visitors 4.8 Diversify tourist attraction (e.g. golden monkey tracking/viewing) 4.9 Design and install road signs on access routes 4.10 Develop mechanisms for publicity and marketing e.g. tourism brochure 4.11 Annual review meeting held Economic and social activities of local communities supported 5.1 Implement mechanisms for deciding use and disbursing of revenue sharing and MBIFCT funds 5.2 Lobby MBIFCT to train community groups in management skills 5.3 provide technical assistance to improve agricultural and land management practices 5.4 Lobby UNP and DDC to assist local communities with social development activities 5.5 Assist local communities to identify, priorities, and plan their development activities	Community participation in environmental conservation is assured issue of inadequate compensation for displace people resolved Alternative income generation opportunities are availed in local communities Tourist flow continues

MGNP Management system improved 6.1 Review and update park zones 6.2 Construct park headquarters and staff accommodation in MGNP 6.3 Improve park access roads 6.4 Development and implement a Monitoring and Evaluation Programme 6.5 Identity and procure vehicle and equipment needed for park operation 6.6 Establish vehicle and equipment maintenance system and procedure 6.7 Maintain/continue park patrols 6.8 Develop and implement staff training programme 6.9 Maintain financial and accounting systems and procedures 6.10 Review and report on implementation of Management Plan MGNP Income Increased 7.1 Investigate possibilities of revenue generation through granting of concessions 7.2 Buy private land or acquire government land for concession 7.3 Keep tariffs under review International Co-operation in Support of MGNP improved 8.1 Solicit donor support 8.2 Produce and distribute MGNP brochures, films, etc. to international community 8.3 Organise workshops, seminars, etc. with international community 8.4 Enhance links with neighbouring countries park authorities Formerly cultivated area revegetated 9.1 Establish revegetation programme in formerly cultivated [INFO] 9.2 Establish a tree nursery near permanent water source 9.3 Control exotic vegetation 9.4 Establish research programme	**Preconditions** **....to carry out Management Actions** Peace prevails in Kisoro district Donor support is maintained Funds are available

[!!!] Sensitive/important [INFO] More information needed [ ] Dissent/controversy

* If no satisfactory solution to the problem of crop raiding by wild animals can be found and implemented then the question of compensation will arise

APPENDIX 3

BWINDI IMPENETRABLE NATIONAL PARK
MULTIPLE USE FORMS

Field Forms

01 Basketry/Medicinal plant user and species record form
02 Locations recording form
03 Demanded species information form - field version
04 Parish workshop attendance form
05 Activity report form
06 Harvest record form

Summary Forms

20 Demanded species summary form - basketry and medicinal plants
21 Nominated resource user summary form
22 Demanded species information form- individual species
Example *Loesneriella apocynoides*

BWINDI IMPENETRABLE NATIONAL PARK		BASKETRY SPECIES, USERS AND SPECIES RECORD FORM		FORM CODE: BINP MUF 01
PARISH NTEKO	DATE 6/7/94	RECORDER(S) MU-TERM.		Page 4 of 10
LOCAL NAME	LIFE FORM	PARTS USED	LOCATIONS	ABUNDANCE, QUANTITIES USED, SEASONS AND OTHER COMMENTS
USER NAME TOMASI	BYARUGAHARE	(cont.).	VILLAGE:	
Ebihunji			Kyitobere, Kihunji, Mukore	Ebirago.
OBUKOZO	TREE	GUM	Myabweru, Hunurambwe, Kanyangwe.	Knives, pot protectors.
USER: JOVIA BUSINGE.		VILLAGE:	KIKOMO	AGE: GENDER: FEMALE
ENSHURI			Myabweru	Ebitukuru, Entara
OBUKOGOSO			Kyitobere	Ebiibo.
EMIJEGA			Kanangwe	Kuranda inyungu., Ebihumi
OBUKUNJI			Kihungi.	Ebirago - mats.
USER: KAMYONI	ZAKAYO.		VILLAGE: ?	AGE: GENDER: MALE
ENSHURI			Kyitobere Myabweru	Ebitukuru, Entara,
EMIJEGA			" "	Ebihumi (Granary) Kuranda inyungu.
USER: TUMUTHENG ROSARIA			VILLAGE: KABAYA	AGE: GENDER: FEMALE
EBIGAGA	(like papyrus)		in village - on farm,	~~Ebiibo~~ Ebiibo Mats &
OBUHUU (Obihunji)			Kihungi	young shoots 2-3 times per month.

NOTES: TO BE USED FLEXIBLY FOR FIELD RECORDING.

1. Local name; record language if not Rukiga 2. Life form; see multiple – use field handbook, tree, shrub, liane, creeper, herb, grass, fern, palm.
3. Parts used; (see MU handbook) Leaf = lf. Bark = Bk. Inner Bark = I–Bk. Outer Bark = O–Bk. Growing Bark = G–Bk. Roots = Rt. Stolon = Sto. Gum = gm
4. Locations; Also fill in locations form 5. Abundance, Quantities and other comments; (see MU field handbook) TM to get other information, preferably fill in species information form.
6. User name; use one line of the form for each new user.

BWINDI IMPENETRABLE NATIONAL PARK					FORM CODE: BINP MUF 02
LOCATIONS RECORDING FORM					PAGE 1 OF 1
PARISH: Nteko		DATES: 5 - 8th July 1994			RECORDERS: Rob Wild
INFORMANTS:	Nominated basket makers Nteko				
LOCATION NAME	**IN or OUT**	**TYPE**	**PARISH Responsible**	**Resource**	**COMMENTS**
Rukubira	I	Hill	Mukono		
Mubare	I	Hill	Mukono		Source of many materials main range of Mubare group
Ivi	I/O	River		Fish	River which forms Park boundary, upstream becomes Kashasha,
					people want fishing here
Kihungye	I	River		Basketry	Flows between Murore and Mubare hill joins Ivi where name
					changes to Kashasha. Main source of Rafia palm (Buhungi)
Katendegyere	I	River			Joins river Kihunge. Foot path passes exactly at confluence
Katendegyere	I	Hill		Basketry	Main location of Omujega in the area
Mushasharara	I	River			
Murore/Kyitobere	I	Hill	Nteko	Basketry	Key resource area and potential multiple-use area
Kamushongyi (1)	I	River	"		Small river rising from Nyabweru - Kaziniro and joining R. Kihunji
Nyabweru	I	Hill	"	Basketry	Trail passes over top
Kaziniro	I	Hill	"	"	Adjacent to Nyabweru
Nyarugaragara	I	River	"		Rises in (multiple-use) Rurambwe and passes by Kashure and
					Nyabweru
Kashure	I	Hill	"		There is a ranger camp at the bottom of the hill where trail crosses
					the River Nyarugaragara
Rurambwe	I	Hill	"		
Nkarugaragara	I	Hill	"		
Nkuringo	I	Hill			
Kamushongye (2)	I	River			
Kasotora	I	Hill	?		
Bikingi	I	River	?		
Katwe	I	?			
Katwekare	O				In Zaire
Kakamba	O				In Zaire
Bizenga	I				Part of Katwe hill
Mugumatekye					
NB: Responsibilities are assured and need confirming					

BINP IMPENETRABLE NATIONAL PARK		BINP MUF 03
DEMANDED SPECIES INFORMATION FORM - FIELD VERSION		
PARISH:	RECORDER:	DATE:
INFORMANTS:		
LOCAL NAMES:	LANGUAGE:	
BOTANICAL NAME:	FAMILY:	
LIFE FORM:		
USED FOR:		
PARTS USED:		
SIZE OF PART USED:		
QUANTITY AND SIZE OF MATERIAL TAKEN FROM FOREST:		WEIGHT:
PROCESSING(1):		
QUANTITY (FOR 1 PRODUCT AND BASKET) (PER MONTH MED)		
HOW OFTEN COLLECTED:		
SEASONS:		
GROWTH RATE(2):		
DOES PLANT OR PART REGROW:		
HOW LONG BEFORE HARVEST SAME PLANT:		
WHERE DOES IT GROW, LOCATIONS		
WHERE DOES IT GROW, HABITAT(4)		
HOW DOES IT REPRODUCE:		
DOMESTIC USE OR FOR SALE:		
WHERE TO SELL:		
AND HOW MANY, PRICE:		
IS THERE A BIG DEMAND:		
HOW MANY PEOPLE CAN HARVEST IN THIS AREA SUSTAINABLY(5):		
OTHER INFORMATION:		

Notes: Use individual or group interview 1. Processing Less important for individual herbs
2 Growth rate; Can use pairwise ranking for several species 4. i.e. hills, valleys 5. Try to estimate users and quantities

BINP | PARISH WORKSHOP ATTENDANCE FORM | FORM CODE: BINP MUF 04

PARISH: | SUB-PARISH | RECORDER

DATE	TIME		START NO		MAXIMUM NO		BATWA MAX. NO		MAXIMUM
	START	FINISH	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN	TOTAL

B I N P	ACTIVITY REPORT FORM	FORM CODE BINP MU F 05
PARISH:	DATE:	RECORDER(S)
ACTIVITY TITLE		ATENDANCE:

Notes: Activities such as Key Events, Ground map, Matrix Ranking, Key Informant Interview, Resource Plot, Sketch Maps, Plot Harvest Data, etc, Use one or more form for each activity.

BINP	SPECIES HARVEST RECORD FORM		FOR CODE: BINP MUF 05 06
DATE:	PARISH:	SUBPARISH	RECORDER	PLOT ALTITUDE
TOTAL NO OF USERS	LOCATIONS HARVESTED FROM:			

NAME OF RESOURCE USER	ID NO	VILLAGE/ RC I ABATAKA/STR. GROUP	SPECIES LOCAL NAME	SPECIES SCIENTIFIC NAME	PART HARVESTED	QUANTITY/ WEIGHT

BINP IMPENETRABLE NATIONAL PARK	DEMANDED SPECIES SUMMARY FORM	SPECIES: Basketry	BINP MUF 20
PARISH: Nteko	DATES[1] 5 & 8 · 7 · 1994	RECORDER(S): Rob Wild, Jane Nampamya, Vincent Mwesiga, Emmanuel Ndikumwami	

LOCAL NAME	BOTANICAL NAME	FAMILY	LIFE FORM	PART USED	NO. OF USERS[2]	LOCATIONS[3]	ABUNDANCE ESTIMATES[4]	COMMENTS
Emijega	Loesneriella apocynoides	Celastaceae	Liane	Vine	13	Nyabweru, Kyitobere, Mubare Kanyangwe, ~~Kifunjo~~ Kinaje		
Embugu /Embungive			Liane		11	mubale Nkuringo, Rubembwe		Embugu
~~Embungwe~~			~~Liane~~		~~0~~	~~Nkuringo, Rubembwe~~		
Emishe			Liane		3	Everywhere, Kashatora Nkuringo		Embugu
Emishabanyama			Liane		1	Mubare		Embugu
Endengematare			Liane		4	Everywhere, Rubembwe		Embugu
Ebihunji	Raphia farinifera	Arecaceae	Palm			Katwe, Musharara, Kyitobere Kihunji, Mubare		
Enshuri	Smilax kraussiana	SMILACACEAE ~~Silacaceae~~	Liane	Stolon	13	Kashiru, Kyitobere, Kaziniro Nyabweru, Kihunji		
Engonderero/Entaro			Liane		2	Mubare, Nyabweru, Kanangwe Kyitobere, Kaziniro		
Enchenche	Dracaena laxissima	Agavaceae	Shrub	Stem	12	Bizenga, Kyitobere, Nyabweru Bikingi, Nkuringo, Kaziniro,		
Obukogoso/Obukogoto			Herb	Stem	3	Kashotora Kyitobere		
Obukozo	Symphonia globulifera	Clusiaceae	Tree	Gum	1	Nyabweru, Rurambwe, Kanyangwe		
Eminaaba	Triumphetta sp.	Tiliaceae	Shrub	Bark	1	Mugumatekye		
Emishengenyama					4	Rurembwe, Nkuringo, Kashotora		
Emishegye/Emisheje			Liane		6	Nkuringo, Kihunji		
Obuzigampundu			Liane		1	Burembwe		
Bikaku			Liane		1	Nyamgaragara		

Notes: 1. Dates; Record all the dates of the Parish workshops 2. Number of suers; Extract from records collected from nominated users MUF 01 3. Locations; use codes from the location code form MUF 25 4. Abundance estimates;

BINP	NOMINATED RESOURCE USERS – SUMMARY FORMS					BINP MUF 21
PARISH:	Nteko	ACTIVITY:		Basketry		PAGE 7 OF
USER CODE	NOMINATED RESOURCE USER	M OR F	AGE	RC I/ABATAKA STR. SOCIETY	# SPECIES USED	OTHER
	Ndemeye Matayo	M	70	Nteko	2	Also unidentified embugu
	Ndagije Karoli	M	44	Nteko	6	
	Rwarinda	M		Nteko	6	Vice chairman RC III
	Kanyabetwa Stephan	M		Nteko	4	
5	Nzarimagwa Maria	F		Murole	3	
	Tomasi Byarugahare	M			6	
	Jovia Busingye	F		Kikomo	4	
	Kanyoni Zakayo	M			2	
	Tumuhirwe Rosaria	F		Kabaya	1	
10	Iyamuremye Porotasi	M		Bushaho	3	
	Pasikari Baryangiraki	M		Kahurire	4	
	Zefania Bamutura	M		Kahurire	4	
	Rwebishenje Paulo	M		Kahurire	2	
	Rwamafa Peter	M		Kabaya	2	
15	Bazonza Daudi	M		Kahurire	3	
	Biriso Nikora	M		Kabaya	5	
	Bihunuira Christopher	M		Kabaya	4	
	Anisoni Ngambekyi	M		Kahurire	3	
	Dezi Bamushobeza	M		Kahurire	4	
20	Barishesya Kabiano	M		Kahurire	4	
	John Baptist Kinyarwanda	M		Kahurire	5	
	Nyambuga Buderia	F		Kahurire	1	
	Byangumaho Samuel	M		Kahurire	5	
	Rosemary Nankonde	F		Kabaya	1	
25	Penina Tumusiime	F		Kabaya	2	
	Matayo Byabajurizi	M		Kahurire	4	
30						

Notes: : 1. Complete name 2. Collect if possible 3. Key multiple—use organisation for this parish 4. e.g. Beekeeper, Herbalist, Hotsprings etc person has been nominated for. 5. Number of species used for activity 6. Code parish code plus user number in that parish e.g NK 003 = 3rd user in Nteko do not code until nomination confirmed.

APPENDIX

MEMORANDUM OF UNDERSTANDING

BETWEEN

UGANDA NATIONAL PARKS
BWINDI IMPENETRABLE NATIONAL PARK

AND

THE PEOPLE OF MPUNGU PARISH
KAYONZA SUB-COUNTY
RUKUNGIRI DISTRICT

APRIL 13, 1994

AN AGREEMENT CONCERNING
COLLABORATIVE FOREST MANAGEMENT

AT

BWINDI IMPENETRABLE NATIONAL PARK

This Memorandum of Understanding has been developed in a collaborative way by the people of Mpungu, staff of Uganda National Parks, the Institute of Tropical Forest Conservation and the CARE, Development Through Conservation Project.

The development of this agreement has taken place during a series of meetings held in Mpungu parish from June 1993 to March 1994.

The Memorandum sets out roles and responsibilities to be taken by all parties in the collaborative management of forest resources.

Memorandum will remain in force indefinitely but can be modified on an annual basis, dependant on agreement by all parties. Uganda National Parks reserves the right to revoke the privilage of resource use should conditions dictate.

Signed this thirteenth day of April 1994.

Chairman Forest Society
Mpungu Parish

Director Uganda National Parks

In presence of

RC II Chairman
Mpungu Parish

In presence of

Senior Warden BINP

MEMORANDUM OF UNDERSTANDING

BETWEEN

UGANDA NATIONAL PARKS - BWINDI IMPENETRABLE NATIONAL PARK
(Hereafter referred to as UNP and BINP)

AND

THE PEOPLE OF MPUNGU PARISH, KAYONZA SUB - COUNTY, RUKUNGIRI DISTRICT
(Hereafter referred to as the community)

WHEREAS BOTH PARTIES AGREE TO:

1.0 Joint Responsibilities

1.1 Form a community and resource user society for Mpungu known as;

EKIBIINA KYA'BEIHAMBA
FOREST SOCIETY - MPUNGU PARISH

(Hereafter called the society)

The society will be responsible for managing and mediating in multiple-use activities.

The objectives of the society shall be as agreed;

- To protect and conserve Bwindi Impenetrable National Park
- To develop and maintain good relationships between the people of Mpungu Parish and the National Park staff.
- To negotiate access to resources from the National Park and participate in developing a system to ensure their utilisation is sustainable.

- To participate in determining the multiple-use areas and assessing and monitoring the levels of each species or resource in those areas.

- To improve the communication between the National Park staff and the community and act as an information link.

- To investigate the illegal use of resources and other illegal activities both inside and outside the multiple-use areas and take appropriate action.

- To encourage the community to grow on their own land species that are not obtainable from the Park and other species as substitutes.

- To collaborate with the BINP staff to find ways of controlling crop damage by wildlife.

- To encourage the collaboration between the traditional herbalists and medical personnel.

- To control the nominated resource users to ensure high standards of behavior within the National Park and that the benefits of utilisation of resources are equitably shared amongst the community.

The membership of the committee will be as follows:

1 representative of each stretcher society	25
2 representatives of resource user groups (e.g herbalist)	4
Chairperson RC II	1
Patrol Ranger of UNP	1
Community Consevation Ranger	1
DTC Conservation Extension Agent	1
Chairpersons RC I	2
Women representatives RC I	2
Religious leaders	2
Parish chief	1
Sub-parish chiefs	2
TOTAL MEMBERSHIP	42

(see section 4.1a for names of representatives).

The committee shall elect an executive of five (5) which shall consist of chairman, vice chairman, secretary, treasurer and women representative. (4.1b)

The Forest Society will meet not less than three times per year and will send an elected representative to BINP resource user committee.

One of the three meetings shall be an Annual General Meeting (AGM) at which the memorandum and its implementation will be reviewed and appropriate changes made. All the resource users with permission go into the forest, the Warden-in-Charge, Community Conservation Warden, Law Enforcement Warden and Institute of Tropical Forest Conservation (ITFC) representative should be invited to attend. Changes to the memorandum will be confirmed by a letter from the Warden-in-Charge. The meetings shall be open to non-participating observers.

The elected representative to the Bwindi Resource Users Committee shall also liaise with the Sub-County representatives that sit upon the Park Management Advisory Committee (PMAC) to forward issues to and receive communications from that committee.

1.2 Initially resource users shall arrange to go to the multiple-use areas with the patrol and community conservation ranger. This will be so the rangers learn the key areas for resource and the methods of harvesting.

1.3 The resource users and the society position holders will walk the boundaries of the multiple use areas prior to the commencement of activities. Ignorance of the boundary will not be accepted as an excuse for harvesting outside the multiple-use areas.

1.4 The society shall discipline any of the nominated resource users, or community members who break the provisions of this agreement. If the cases are of a serious nature they will be passed on to RC, UNP or Police, as appropriate.

1.5 The society shall compile the monitoring records maintained by the stretcher societies as follows;

- Dates of resource users going to the forest.
- Species and quantities collected.
- Illegal activity detected.
- Animals met e.g gorillas.
- Infringement/cases dealt with, fines given out.

N.B. It is recognised that the stretcher societies -ebibiina by'engozi represent village organisations, and are infact citizen groups or Abataka. All household heads are members of the stretcher societies and their leaders have the confidence of the community.

WHEREAS

2.0 Responsibilities of Uganda National Parks

Uganda National Park Authorities at BINP will allow nominated resource users from Mpungu Parish the privilege of access to resources and the general public to use the footpaths and the hotsprings, as laid out in the following schedule.

2.1 Medicinal plants

The herbalists named in section 4.2a will be allowed to collect parts of the medicinal plant species listed in section 4.3b.

2.2 Basket makers

The basket makers named in section 4.2b will be allowed to collect basket making materials from the species listed in section 4.3d.

Women basket makers named will be allowed to collect species listed in section 4.3c.

In addition, the stretcher societies recognised within the parish (section 4.1) will be allowed to apply to collect vines from the forest to be made into stretchers, from species listed in section 4.3c. It is presumed that a stretcher society needs a replacement stretcher every 10 years.

2.3 Footpaths

Certain footpaths will be allowed to be used by the general public. These will be identified for the whole National Park and will be communicated seperately at a future date, by the Warden-in-Charge.

2.4 Hotsprings

The general public will be allowed to use the hotsprings marked on the map section 4.4 for curative purposes.

2.5 Multiple-use Areas

The National Park agrees to identify, negotiate and delimit, in conjunction with the society, areas for the collection of the above resources. These areas will be known as multiple-use areas and are laid out on the map and boundary description (Section 4.4).

In the event of the use of the multiple-use areas by gorillas, the multiple-use area or parts of them will be closed during the stay of the animals to avoid danger to resource users or disease transmission risks. The patrol ranger or Community Conservation Ranger, will be responsible to inform the chairman of the Forest Society.

The nominated resource users with identity cards will then be allowed to collect parts of the species listed in section 4.3 from within these multiple-use areas. Recording the offtake of resources will the responsibility of the community, monitoring species use levels will be carried out by UNP with the Institute of Tropical Forest Conservation. Resource assements will be a joint activity.

2.6 Problem Animal Control

2.6.1

The National Park Authorities will allow, accompanied by and under the supervision of Park personnel or person(s) nominated by the Warden-in-Charge, the chasing into the forest of wild animals damaging crops as below:

Baboon	Papio anubis
Bush pig	Potamochoerus porcus

2.6.2

Under no circumstances will the following species be chased, or harmed either on public land or within the National Park. Crop damage by these animals should be reported to UNP staff. UNP will make all efforts to protect crops on public land from these animals.

Mountain Gorilla	Gorilla gorilla beringei
Chimpanzee	Pan troglodytes

2.7 Identification Cards

UNP undertakes to issue identification cards to each resource user nominated by the community free of charge. Cards may not be sold, exchanged or transferred to any other person. Card holders will be allowed to be accompanied by one other person, who will be registered with the chairman of the stretcher group. Any resource user or Park staff attempting to charge for cards or access to resources should be reported immediately to UNP or Civil authorities (RC's).

2.8 **Other Assistance**

UNP undertakes to assist the community, through the CARE Development Through Conservation Project, in the on-farm substitution or finding alternatives to resources once but no longer, obtained from BINP. (These include timber, building poles , firewood, beanstakes,) and also to help in improved agricultural production for as long as the CARE/DTC project continues to exist.

UNP also undertakes to provide planting materials (ie bamboo rhizomes or medicinal plant seedlings) of forest species for on-farm planting as long as the propagation is consistent with the conservation of the species.

AND WHEREAS

3.0 **Responsibilities of the Community**

The people of Mpungu in acknowledgment of gaining access to the above mentioned forest resources will undertake to abide by the bye-laws of the National Park and the other rules and provisions laid out in this section.

3.1 **Bye-laws and other rules**

3.1a **Bye-laws**

THE REPUBLIC OF UGANDA, THE NATIONAL PARKS ACT CAPUT 227 OF THE LAWS OF UGANDA AND IN THE MATTER OF BYE-LAWS MADE PURSUANT TO SECTION 12 OF THE NATIONAL PARKS ACT FOR BWINDI IMPENETRABLE NATIONAL PARK.

In the exercise of the powers conferred upon the trustees of Uganda National Parks, pursuant to section 12 of the National Parks Act, the Trustees, have found it expedient to make the following Bye-laws;

1. These Bye-laws may be cited as the Bwindi Impenetrable National Park Bye-laws, 1993.

2. In these Bye-laws, unless the context otherwise requires, the words defined below shall be presumed, so far as consistent with these Bye-laws, to be with the meaning to them hereunder and shall be construed in accordance there-with:

"PARK" means the National Park in the area if Bwindi sanctuary and established by the proclamation contained in the Legal Notice Statutory Instruments 1992 No 3 and known as the "Bwindi National Park".

"TRUSTEES" means the Trustees of Uganda National Parks appointed under the provisions of section 5 of the National Parks Act, 1964.

3. Nothing in these Bye-laws shall be deemed in any way to affect the servants of the Trustees on duty acting in the scope of their employment under the lawful orders of their supervisors.

4. No person may reside in the Park except with written permission of the Park Warden.

5. No person shall enter the Park without a valid entry permit issued at the discretion of the Warden on behalf of the Trustees unless the person is on a public road/track passing through the Park. The issue of an entry permit shall not "per se" in any way be deemed to make the Trustees liable for injury or damage to the licence whilst in the Park, except on specific proof by the licence that the injury or damage was caused to him/her due to gross negligence of the Trustees'servant.

6. No person may camp in the Park in areas reserved and marked as camping grounds without the written permission of the Warden.

7. No person shall drive within the Park boundaries, travel or ride in any vehicle except in areas reserved for that purpose and with the written permission of the Warden, permission may be granted for bicycles to be ridden on some trails and nor otherwise.

8. No person shall drive a vehicle at a speed greater than 30 km per hour within the Park boundaries.

9. All drivers within the Park shall obey the rules and regulations established by the Park regarding motor-vehicle use.

10. No person having been allowed to drive in the Park shall park his vehicle within the Park in such a way as to obstruct any Park road, track or trail. Any person who contravenes the Bye-law commits an offence for which he may be liable for prosecution.

11. No person shall use any road, track or trail closed by order of the Warden. Any road, track or trail on which there is notice that it has been closed by the Warden shall be deemed so closed until otherwise ordered by the Warden.

12. No person shall leave or step or alight from the established trail system unless directed by the Warden or Ranger Guide.

13. No person shall bring into the Park without permission any firearms or ammunitions. Any permission granted under the Bye-law may be granted subject to such terms and conditions as the Warden may see fit.

14. No person shall cause noise by radios, tape players or discos within the Park.

15. No person shall light any bonfires except in places set aside for that purpose.

16. No person shall touch or feed animals.

17. No person shall bring a dog or other domesticated animals or plants into the Park.

18. No person shall damage, scare, threaten or harass any wildlife or animals within the park.

19. No person shall remove from the Park any wildlife or animals, rocks, vegetation or trees without a written permission of the Warden.

20. No person shall approach large mammals especially elephants and gorillas without a ranger guide.

21. No person shall keep any number of beehives in the Park except in areas designed for that purpose and with the supervision of Park staff.

22. No person shall leave litter or human waste except in places reserved for that purpose.

23. No person shall interfere with any boundary beacon or marker within or at the edge of the Park.

24. Subject to any special directions that may be given by the Warden from time to time, no person may enter or move within the boundaries of the Park between 7:15 p.m and 6:30 a.m.

25. Non-governmental organisations operating within the Park shall do so only with the permission of the Warden and Trustees. All such bodies are responsible for the good conduct of their members and visitors while within the Park boundaries.

26. The fees specified in the first schedule shall be payable for the services and permits set out in respect of such services and permits in the schedule.

27. The forms set out in the second schedule of the form to a like effect shall be used for the purposes assigned to them in the schedule.

28. Any persons entering the Park do so at their own risk.

3.1b Other rules

In light of the risks of disease transmission to rare primates resource users agree not to spit or defecate within the National Park. If spitting or defecating is necessary both should be buried, to a depth of 10 cm.

Those suffering from any infectious diseases (including colds and flu) must not go to the forest. Sugar cane must not be eaten within the forest. Food remains of other foods any any rubbish must be carried from the forest.

Community members agree not to light fires within the forest, or allow fires to spread into the forests from outside, and will mobilise to put out fires to which have started either within the multiple-use areas or other areas of the forest near or adjacent to the Parish.

3.2 Herbalists

a) The herbalists nominated by the community and listed in section 4.2a agree to collect for their own medical practices and not for commercial sale, the plants listed in section 4.3b. Any individual from within or outside its community intending to buy, or collect large quantities of a medicinal plant will be reported immediately by the community to the National Park Authorities.

b) herbalists agree to report to the National Park Authorities any noticed decline in species they are harvesting.

c) Collection of bark will be done in such a way not to damage the source tree. That is only outer bark (phloem) will be harvested not growth bark (cambium) or inner bark (xylem).

3.3 **Basket Makers**

a) Basket makers nominated by the community and listed in section 4.2b agree to collect vines and other species for baskets they make themselves for sale within the community, from those species listed in section 4.3d. They also agree to collect during 2 seasons which are June and November and agree to collect the quantities specified in section 4.3c.

b) The women basket makers who collect species listed in section 4.3c agree to collect these species as a group, no more than five (5) times during each season, seasons are July and December. They agree to go with a park ranger.

c) They agree to report to the National Park Authorities any noticed decline in species they are harvesting.

3.4 **Footpaths**

The community of Mpungu which is using the authorised footpaths agree to abide the bye-laws of the National Park and control community members who are using the paths. They also agree to educate people from outside who pass through Mpungu on the rules of using the footpaths.

3.5 **Hotsprings**

Users of the hotsprings agree to respect the bye-laws and general rules in this document. In particular those that pertain to footpaths and applied to the footpath to the hotsprings and those related to disease transmission to rare primates as laid out in section 3.1.

The community shall nominate a chairman and a vice chairman of the hotsprings to maintain them, ensure users are abiding by the regulations, and to maintain the access footpath.

3.6 **Multiple Use Areas**

The people of Mpungu agree to recognise the agreed boundaries of the Multiple-use areas, and not enter or harvest from other areas.

3.7 **Problem animal control**

3.7.1
The community agrees when on organised chasing of species mentioned in 2.6.1, they will not kill those animals, or carry out any other contravention of the bye-laws mentioned in 3.1.

3.7.2

Any individuals of species identified in 2.6.2 (ie Mountain gorilla or chimpanzee) and found crop raiding on public land will not be chased, harassed or harmed. They will be reported to UNP staff.

3.8 **Identification Cards**

Resource users issued with free identification cards will not exchange or sell these cards with/to any other person. Neither will they tamper with them in any way. Card holders will provide two (2) passport sized photographs.

3.9 **Substitution of Resources**

The people of Mpungu undertake to grow upon their own land, resources to replace those which can no longer be allowed to be obtained from the National Park, and will make efforts to extend the length of life of some of those forest products (such as beehives and beerboats) by careful maintenance. They will make requests for on-farm planting materials through the community conservation rangers or DTC CEA's.

3.10 **Illegal Activities**

The people of Mpungu undertake to minimise the illegal activities occurring within the Multiple-use areas and other areas of the forest near or adjoining the parish, and will maintain records of all such activities (cases, arrests, fines given etc).

SECTION 4.0. REPRESENTATIVES, REOURCE USERS, RESOURCES AND AREAS

SECTION 4.1. REPRESENTATIVES.

4.1a Membership of the Forest Society

Stretcher Society		Chairman - Representatives	
Buremba Sub-Parish			
1. Kanyashogye		Francis Tweheyo	
2. Kinyangagi		Felix Tumukuratire	(Chairman)
3. Murushasha		George Mushuhukye	
4. Rukungwe		James Beebwa	
5. Rurugarama		Ziriruka Moses	(Secretary)
6. Kitahurira		Joseph Tawaabo	
7. Buremba		Tusingwire Fenehansi	
8. Kishaga		Tumwine John	
9. Katunda		Bekunda Marisiari	
10. Bugiri		Zibungire Keleofasi	
11. Nyamizo		Turyahabwa George	
Muramba Sub-Parish			
12. Kibingo		Kanyaruju Visensio	
13. Karambi 1		Francis Turinabo	
14. Karambi 2		Rudodo E.	
15. Muramba		Bamuriho Vanansi	
16. Kigaaga		Bitakaramire Furigensi	
17. Nywero		Katimbire Charles	
18. Ngaara		Bagira Jackson	
19. Kyambeya		Kanyarugokwe Kelesi	
20. Murukore		Bariyanga Mariusi	
21. Katokye		Bwanakosa Godfrey	
22. Busheganyi		Rwebishaka Turisifolo	
23. Bubare		Ndyarangwa	
24. Bugarama		Bagamuhunda Earnest	
25. Kibale		Matumbika Adrone	(Vice Chairman)
26. RC II Chairman	Mpungu	Tumwesimire Caleb	
27. RC I Chairmen	Muramba	Butamanya Visensio	
28.	Buremba	Tukamusherura John.	
29. Religous Leaders	Muramba	Yosefu Bitarabeho	
30.	Buremba	Rev. G. Karambuzi	
31. Park Ranger		Byarugaba Ignitius	
32. Parish Chief		Tumuherwe Yosamu	
33. Sub-Parish chiefs	Muramba	Bitarabeho Jackson	
34.	Buremba	Beeyeza	
35. Herbalists		Zikankuta Jack	(Treasurer)
36.		Kagwimukana Tereza	(Womens Representative)
37. Basket Makers		Tibirikwata Edward	
38.		Kamuhanda	

39. Women representatives
Muramba Kagwimukama Theresa
40. Buremba Edurida kaburahona
41. DTC/CEA representative
42 Community Conservation Ranger

4.1b Executive Committee

An Executive Committee was elected from the society members

Felix Tumukuratire	Chairman
Matumbika Adrone	Vice Chairman
Ziriruka Moses	Secretary
Zikankuta Jack	Treasurer
Kagwimukana Tereza	Womens Representative

SECTION 4.2 RESOURCE USERS

4.2a Herbalists

The following herbalists were nominated to collect the species listed in section 4.3b

Buremba Sub-Parish

Herbalist	Stretcher Group
1. Kaburahona Edrida	Kanyashogi
2. Zikankuta Jack	Murushasha
3. Bagira Provia	Kanyashogi
4. Baribwihane S.	Kanyashogi
5. Nduhira Stanley	Murushasha
6. Bajunirwe Nasani	Rukungwe
7. Biryabarema David	Rukungwe
8. Kajoka Ruragire	Kitahurira
9. Tushabe Paulina	Kitahurira
10. Baryayebwa E.	Kitahurira
11. Kaseeta Yosoni	Murusindiriro
12. Beiteise Cornario	Katunda

Muramba Sub-Parish

Herbalist	Stretcher Group
13. Kabwimukama Tereza	Karambi 1
14. Nyenyezi Musa	Karambi 2
15. Ndibanobe Julian Mrs	Nywero
16. Kikirwa Yacob	Nywero
17. Birihamutwe Clecencio	Katokye

4.2b Basketmakers

4.2b The following basket makers were nominated to collect species listed iection 4.3d.

Buremba Sub-Parish

Basket Makers	Stretcher Group	
1. Tibirikwata Richard	Kanyashogye	
2. Rukeijakare Aurelian	Kinyangagi	
3. Mushuhukye George	Murushasha	
4. Bangweneeza Lilian F	Kanyashogye	Womens representative
5. Babyebuza Jackson	Rukungwe	
6. Zimbehire Runaku	Kitahurira	
7. Bandusya Yakobo	Kitahurira	
8. Bareebe Mishakyi		
9. Busimba Zedi	Bugiri	
10. Gakyaro Charles	Kiizi	
11. Beebwa James	Kanyamisinga	
12. Ndyanabangi M.	Kataazo	

Muramba Sub-Parish

Basket Makers	Stretcher group
13. Rubungira Didas	Kibingo
14. Rwakitare Clecencio	Kibingo
15. Mpumuza Damiano	Karambi
16. Rwabuhe Steven	Karambi
17. Kasyazo Silverino	Karambi
18. Tibagirirwa Olivia (Mrs)	Muramba
19. Bitakaramie Furigence	Kigaaga
20. Mahirane Thomas	Hamurwa
21. Nyamijumbi kajungu	Bubare
22. Kamango Edward	Bubare

4.2c Mineral spring office holders.

Chairman: Rubungira Didasi

Vice chairman: Rwabinyasi Paurino

SECTION 4.3 RESOURCES

4.3a Medicinal herb species, parts and quantities allowed.

FAMILY	SPECIES	LOCAL NAME	PART ALLOWED	LIFE FORM	QUANTITY ALLOWED PER PERSON PER YEAR	No. OF USERS	TOTAL QUANTITY ALLOWED PER YEAR
RUBIACEAE	Rytigynia kigeziensis	Nyakibazi	outer bark	Shrub	one palm size	14	14 palm sizes
EUPHORBIACEAE	Croton macrostachyus	Omurangara	Leaf/Bark	Tree	1/2 palm size	5	2.5 palm sizes
PIPERACEAE	Piper guineensis	Rukokota	Root	Creeper	60 finger lengths	7	420 finger lengths
RHAMNACEAE	Govania longispicata	Omufurura	Leaf	Creeper	12 handfuls	7	84 handfuls
LAURACEAE	Ocotea usambarensis	Omwiha	outer bark	Tree	12 palm sizes	7	84 palm sizes
MARATTIACEAE	Marattia fraxinea	Omutumbagire	Leaf	Fern	120 leaflets	4	480 leaflets
CELASTRACEAE	Maytenus acuminata	Omulembwe	Leaves	Tree	A handful	2	24 handfuls
EUPHORBIACEAE	Neobotania macrocalyx	Omwanya/Ekyanya	Bark/Leaves	Tree	12 handful of leaves 12 palm sizes of bark	4 4	48 handfuls of leaves 48 palm sizes of bark
MYRICACEAE	Myrica salicifolia	Omujeje	Bark	Tree	12 Palm sizes of bark	1	12 palms of bark
MORACEAE	Myrianthus holstii	Omwifa	Fruit	Tree	12 fruits	1	12 fruits
GUTTIFERAE	Symphonia globulifera	Omusisi	outer bark	Tree	12 palm sizes of bark	1	12 palm sizes of bark
ROSACEAE	Prunus africana	Omuuba	outer bark	Tree	12 Palm sizes of bark	4	48 palm sizes of bark
RHAMNACEAE	Maesopsis eminii	Omuguruka	outer bark	Tree	12 palm sizes	2	24 palm sizes of bark
CYTHEACEAE	Cyathea maniana	Ekigunju	Leaves & Bark	Tree fern	six handfuls of leave six palms of bark	1	6 handfuls of leaves 6 palms of bark
THEACEAE	Ficalhoa laurifolia	Omuvumaga	Bark	Tree	12 Palm sizes of bark	2	24 palm sizes of bark
MYRTACEAE	Syzigium guineense	Omugote	Bark/leaves	Tree	12 palm sizes of bark 12 handfuls of leaves	2	24 palm sizes 24 handfuls of leaves
RUTACEAE	Fagara macrophylla	Omushaga	Bark	Tree	12 palm sizes of bark	1	12 palms of bark

4.3b MEDICINAL HERB SPECIES ALLOWED BY EACH HERBALIST.
The rows refer to herbalists named in section 4.2a

Medicinal Plants	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Nyakibazi	*	*		*	*	*	*	*	*		*	*	*	*	*		*
2. Omurangara	*						*	*	*			*					
3. Omufurura	*	*		*		*				*				*			*
4. Omulembve	*														*		
5. Omwiha		*		*				*		*				*	*		*
6. Omutumbagire				*		*	*	*									
7. Rukokota		*		*		*		*	*					*	*		
8. Omwanya		*		*		*		*									
9. Omujeje			*														
10. Omwifa			*														
11. Omusisi			*														
12. Omumba						*		*			*					*	
13. Omuguruka								*			*						
14. Ekigunju								*									
15. Omuvumaga					*			*									
16. Omugote										*		*					
17. Omusbaga												*					

4.3d BASKETRY SPECIES ALLOWED BY EACH BASKET MAKER.

NAMES	EBITA-TARA	ENKY-ENZI	OMWIRU	OBUKO-GOSO	ENTARO	ENSHURI	ENCHE-NCHE
1. Tibirikwa R.					*	*	*
2. Rukeijakare A.					*	*	*
3. Mushukukye G.					*	*	*
4. Bagweneza L.	*	*	*	*			
5. Babyebuza J.					*	*	*
6. Zimbehire R.					*	*	*
7. Bandusya Y.					*	*	*
8. Bareebe M.					*	*	*
9. Busimba Z.						*	*
10. Gakyaro C.					*	*	*
11. Beebwa J.					*	*	*
12. Mdyanabangi M.					*	*	*
13. Rubungira D.					*	*	*
14. Rwakitare C.					*	*	*
15. Mpumuza D.					*	*	*
16. Rwabuhe S.					*	*	*
17. Kasyazo S.					*	*	*
18. Tibagirirwa O.	*	*		*			
19. Bitakaramire F.					*	*	*
20. Mahirane T.					*	*	*
21. Nyamijuchi K.	*		*	*			
22. Kamango E.					*	*	*

4.4 Boundary description with boundary map

(a) NTENDURE-RWANZO Multiple Use Area (MUA) Buremba sub parish.

Eastern boundary

The boundary follows Ntendure trail.
Enter the forest at point (1) on Ntendure trail coming from Nyarumbya village. The trail goes down hill to River Mbwa. The trail then crosses the River Mbwa and climbs Ntendure hill passing 100 metres to the east of River Ntendure. It passes through a patch of Kakoba trees (Croton megalocarpus) and then to a fork in the trail.. The multiple use boundary follows the Mezimeru - Kasura - Bizenga trail which is the right fork. The left fork is the Mburamezi trail. The trail climbs to the ridge at the top of Ntendure called Nkurungo ridge at point (2).

The trail (boundary) turns to the west passing the head of River Ntendure valley then drops down to the Bitanwa ranger camp in Kasinga valley. From Bitanwa camp the trail (MUA boundary) passes southwards, crosses, meets the River Kasinga point (3). The MUA boundary then follows River Kasinga down stream to the confluence with River Ihihiizo, point (4).

Southern boundary

The MUA boundary then follows River Ihihiizo downstream to confluence with River Bizibutukura point (5). The MUA boundary then goes up River Bizibitukwa to a point on the river closest to Rwanzo-Kisya hill, point (6). The MUA boundary crosses in a straight line the shortest distance to the highest point of Rwanzu - Kisya hill, point (7).

Western boundary

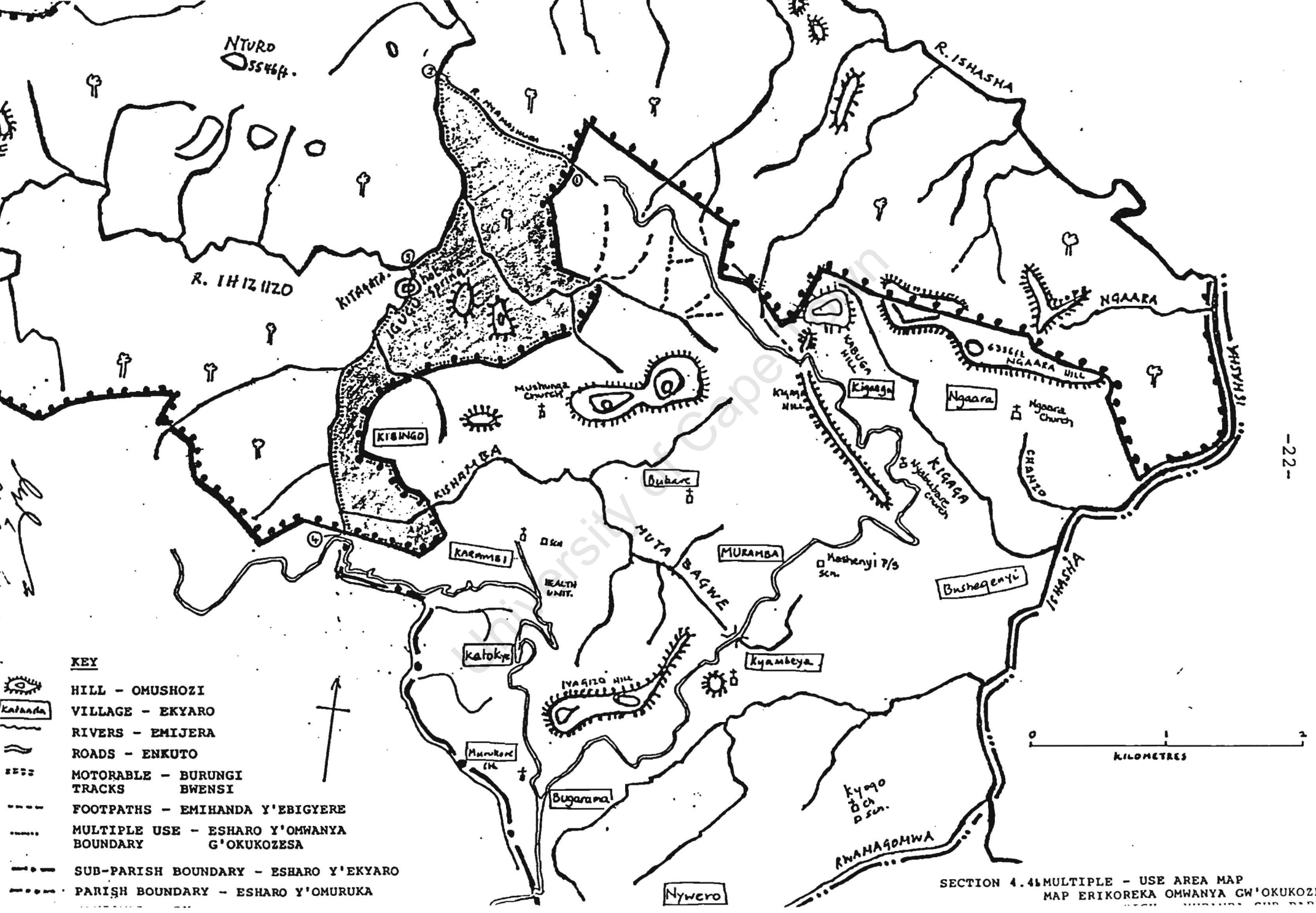
From the top of Rwanzo-Kisya the MUA boundary descends in a direct unmarked line to the valley head of River Kibonano, point (8). From there it follows a trail to the main Bismuth mine, marked by pine and cyprus trees point (9). From here the MUA boundary follows a path directly down hill to the abandoned mine base camp point (10), cutting off a loop of the motorable track which passes to the north west. From the abandoned lower mine camp, the boundary passes along parts of the once motorable track and in parts takes short cut in road loops to the sharp corner on the Mpungu-Bujengwe road at the boundary of BINP, point (11).

Northern boundary

This is the boundary of the National park from point (11) on the Mpungu - Bujengwe road at Kitahurira, to the entry of the Ntendure trail point (1).

(b) **KIBALI-NYAMIGAJU Multiple-Use Area Muramba sub parish.**

The MUA boundary enters the National park near Bubare village, point (1) and follows the course of the River Nyamashuri to the confluence with the River Ihihiizo, point (2). It follows the course of River upstream to confluence with River Igugu, point (3), and then upstream of River Igugu until it meets the National Park boundary near Karambi village, point (4). The MUA boundary then follows the National park boundary from point (4) to point (1).



SECTION 4.4 MULTIPLE - USE AREA MAP
MAP ERIKOREKA OMWANYA GW'OKUKOZESA